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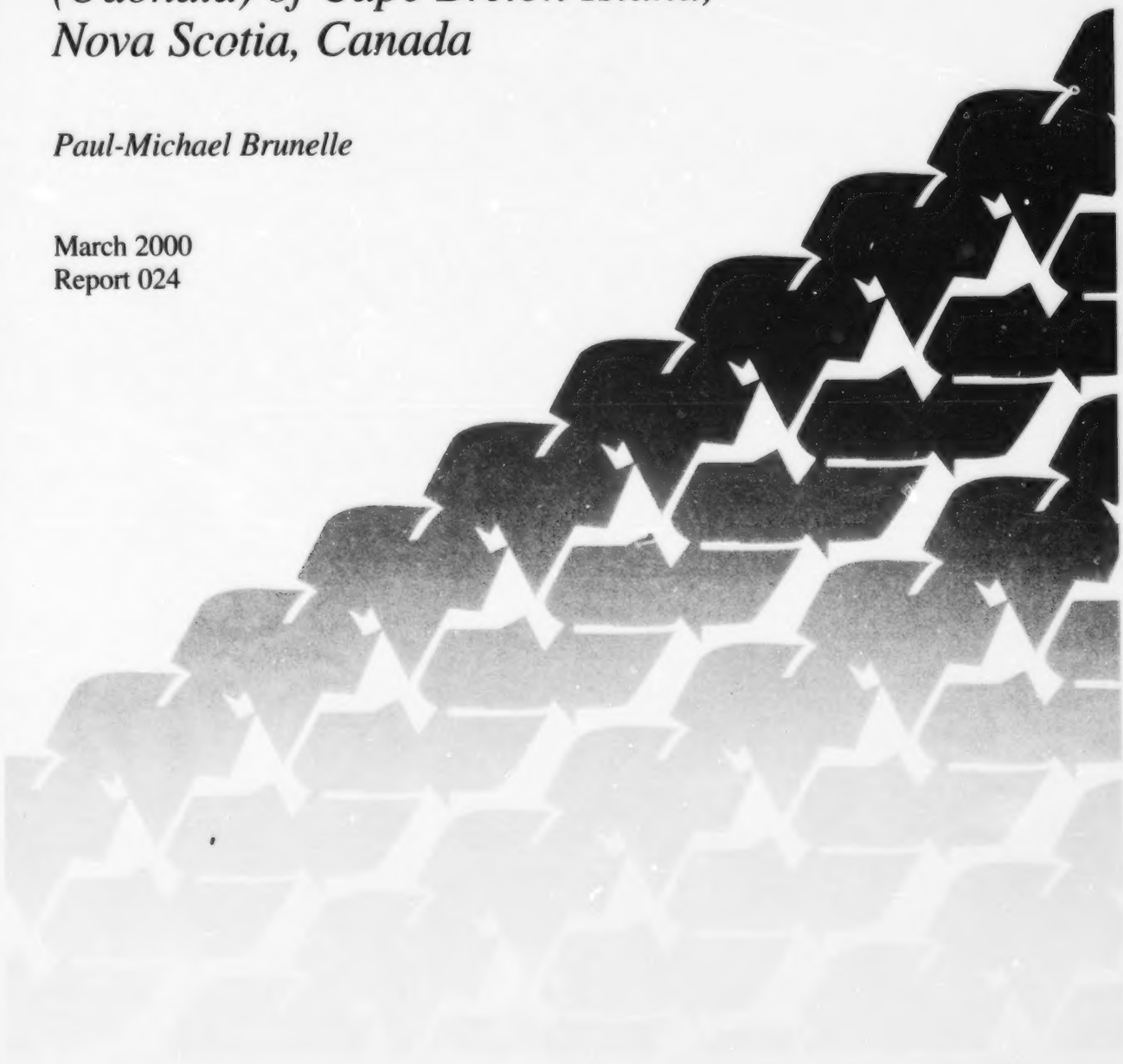
Distribution of damselflies and dragonflies (Odonata) of Cape Breton Island, Nova Scotia, Canada

Paul-Michael Brunelle

March 2000
Report 024



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Distribution of damselflies and dragonflies (Odonata) of Cape Breton Island, Nova Scotia, Canada.

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Brunelle, P.M. 2000. Distribution of damselflies and dragonflies (Odonata) of Cape Breton Island, Nova Scotia, Canada.

Abstract

Knowledge of the Odonata on Cape Breton Island (CBI) as of 1999 has been assessed, yielding a list of 85 species, 24 (28% of the island list) of which are additions to the previously published CBI list. Separate lists for the Lowlands, Highlands and counties are presented.

The majority of the species, 78 (92%), are found in the Lowlands, and 77 (91%) are species whose distribution is principally to the south of CBI. There are 8 (9%) northern species in the list, and of the Highlands list of 55 (65%), two subarctic species are reported only from there *(Somatochlora albicincta* and *S. septentrionalis),* confirming the plateau as having a northern fauna unique in Nova Scotia.

Notes are given on the charcteristics, distribution, and flight period for each species.

Further survey is recommended in order to assess distribution more accurately, and a monitoring program on the status of *Aeshna sitchensis* on the Highlands barrens is suggested as an on-going means of assessing their ecological integrity.

Brunelle, P.M. 2000. Aire de distibution des demoiselles et des libellules (odonates) de l'île du Cap-Breton (Nouvelle-Écosse), Canada.

Résumé

Nous avons évalué les connaissances acquises jusqu'en 1999 sur les odonates dans l'Île du Cap-Breton et avons pu établir une liste de 85 espèces, dont 24 (28 % de la liste) sont des ajouts à la liste dressée antérieurement pour l'Île. Nous présentons des listes distinctes des espèces recensées dans les plaines, les hautes terres et les comtés.

La majorité des espèces, soit 78 (92 %), fréquentent les plaines, et dans le cas de 77 espèces (91 %), leur aire de distribution se trouve essentiellement dans le sud de l'Île. La liste compte 8 espèces boréales (9 %), tandis que sur les 55 espèces (65 %) mentionnées dans la liste des hautes terres, deux sont des espèces subarctiques uniques à cette région – *Somatochlora albicincta* et *S. septentrionalis,* ce qui confirme que le plateau abrite une faune boréale unique en Nouvelle-Écosse.

Nous donnons pour chaque espèce recensée les caractères distinctifs, l'aire de distribution et la saison de vol.

Nous recommandons que soit effectué un autre relevé des espèces d'odonates afin de pouvoir étudier de façon plus precise leur distribution dans l'Île, et que soit mis en oeuvre un programme de surveillance de l'etat d'*Aeshna sitchensis,* qui fréquente les landes des hautes terres, afin de pouvoir en évaluer en permanence l'intégrité écologique.

Introduction

Past Study in the Maritimes

The study of Odonata in the Maritime Provinces has not been pursued with great vigour in the past. Although there are occasional references to the region in taxonomic works of the 19th century, the first paper specific to a Maritimes area was Calvert and Sheraton (1894) which dealt with a small, well-annotated collection in the vicinity of Pictou.

Edmund Walker of the University of Toronto presented the first substantive treatments of the order in the Maritimes; a first list for Prince Edward Island (1917), a list for the Maritimes overall (1933) dealing principally with southwestern Nova Scotia and New Brunswick, and a further paper (1942) on additions to the Nova Scotia list. Carl Cook (1950) presented further records for Nova Scotia based on the collections of the lepidopterist Douglas C. Ferguson, then of the Nova Scotia Museum. Walker's substantial 3-volume national treatment of the order (Walker 1953, 1958, Walker and Corbet 1975) was the first to discriminate Cape Breton Island (CBI) from Nova Scotia overall.

The first work including Odonata specific to CBI was the report by Martin and Allyson (1987) dealing with a broad range of taxa and not greatly detailed regarding odonates. The first published list for CBI appeared in the recent treatment of distribution of the order in the Atlantic Provinces (Brunelle 1997a). That paper included results of a review of Atlantic Provinces holdings in national and regional collections, and private collection as of 1996. Further provincial-level additions were presented in Brunelle (1999a).

It is curious that a proper survey of the order on CBI has not occurred earlier, given that smaller and less ecologically diverse islands in the region have received attention; Prince Edward Island (Walker 1917, Hilton 1990), Îles de la Madeleine, politically part of the province of Québec but biogeographically within the Atlantic Provinces (Williamson 1902, Hilton 1992) and Sable Island (Martin 1970, Wright 1989). Perhaps CBI was not considered sufficiently isolated to harbour a different fauna from the mainland, however the considerably smaller list (now 85 as opposed to 111 species known on the mainland, 116 for the province overall), the lower abundance of many southern species, and the higher abundance of northern species, indicate that the island is biogeographically distinct.

The Current Project

Following publishing of Brunelle (1997) the fact that CBI had a list of 58 species compared to the 54 (now 63, Brunelle 1999a, and recent additions) known from Prince Edward Island, which has less diversity of habitats, suggested that further study on CBI was warranted. This was emphasized by the discovery of a specimen of *Somatochlora septentrionalis* in the Canadian National Collection of Insects (CNCI), taken by J.H. McDunnough in 1941 in the 'mountains above Pleasant Bay', presumably North Mountain, in the Cape Breton Highlands. This subarctic species was not at that time known south of Newfoundland, although it has recently been discovered in northern New Brunswick (Brunelle 1999a).

In 1997 the author was contracted by Cape Breton Highlands National Park (CBHNP) to review information on odonates in northern CBI and to survey in that area. The intention of the contract was to determine the significance and status of the odonate fauna of the Highlands, however it was acknowledged that this could not properly be done without assessing it in comparison to the CBI and regional fauna as a whole. Consequently this paper deals with CBI in total, discriminating between Lowlands and Highlands, and compares the fauna with that of the Atlantic Provinces and northern New England.

Table 1 gives a summary of the principal regional literature upon which consideration of CBI fauna has been based.

Geopolitical areas in the region are; the *Atlantic Provinces*, comprised of Newfoundland, Labrador, and the Maritime Provinces, and the *Maritime Provinces*, comprised of New Brunswick, Nova Scotia and Prince Edward Island. Îles de la Madeleine are considered part of the Atlantic Provinces from the geofaunal perspective. *Acadia*, comprising the Maritime Provinces and the state of Maine, is also considered a valid geofaunal region.

Table 1: **Regional Literature** ■ - principal distribution focus □ - treatment in passing, implicit, or in summary	**Quebec**	Gaspésié	Îles de la Madeleine	**Atlantic Provinces**	Labrador	Newfoundland	**Acadia**[1]	**Maritime Provinces**	New Brunswick	Prince Edward Island	Nova Scotia Mainland	Cape Breton Island	Sable Island	Maine[1]
Calvert and Sheraton 1894				□			□	□			■	□		
Williamson 1902	□		■	□										
Williamson 1906[2]				□		■								
Walker 1912	□		□	□	□	□	□	□	□		□			□
Walker 1916				□		■								
Walker 1917				□			□	□		■				
Walker 1925				□	□	□	□	□	□	□	□			□
Walker 1933				□			□	□	■		■	■		
Walker 1942				□			□	□	■		■			
Walker 1943	□		□	□	□	□	□	□			□			
Walker 1947				□		■								
Cook 1950				□			□	□			■	■		
Walker 1953	□	□	□	□	□	□	□	□	□	□	□	□	□	
Walker 1958	□	□	□	□	□	□	□	□	□	□	□	□	□	
Wright 1989				□			□	□					■	
Martin 1970	□	□	□	□	□	□	□	□	□	□	□	□	□	
Cannings 1980				□		■								
Martin and Allyson 1987				□			□	□				■		
Wright 1989				□			□	□					■	
Hilton 1990				□			□	□		■				
Hilton 1992	□		■	□										
Lauff 1996							□	□				■		
Brunelle 1997a				□	■	■	□	□	■	■	■	■	■	
Pilon and Lagacé 1998	■	■	■	□										
Brunelle 1998a				□			□	□				■		
Brunelle 1998b				□			□	□	□		■	■		
Brunelle 1999a				□			□	□	■	■	■	■		
Brunelle 1999b							□							■

1 A complete list for Acadia is not included; see Brunelle (1999b) for the full bibliography for Maine.

2 In Williamson (1909) the taxonomy of several species reported in Williamson (1906) as being present in Newfoundland was corrected -- *Somatochlora hudsonica* was referred to *S. septentrionalis*, the data on *S. septentrionalis* to *S. franklini*.

Study Area

Cape Breton Island is ca. 9,167km^2 (3,539mi^2) in area and includes 17.4% of the area of Nova Scotia (NSDD 1986). It is the most eastern part of the Maritime Provinces, and spans approximately 100 minutes of latitude and longitude (180 x 160km (112 x 99mi)) with its most northern extension slightly above 47°N – only slightly above the mid-point of the Maritimes (ca. 43.3 – 48.1°).

CBI is isolated from the Nova Scotian mainland by the Strait of Canso, a narrow channel 1km (0.62mi) in minimum width, though averaging ca. 1.5km (2.4mi). The large island of Newfoundland is ca. 100km (62mi) northeast across the Cabot Strait, the small Îles de la Madeleine approximately 85km (53mi) northwest, and Prince Edward Island 50km (31mi) west in the Gulf of St. Lawrence.

Figure 1: **North America**

Figure 3: **Cape Breton Island**

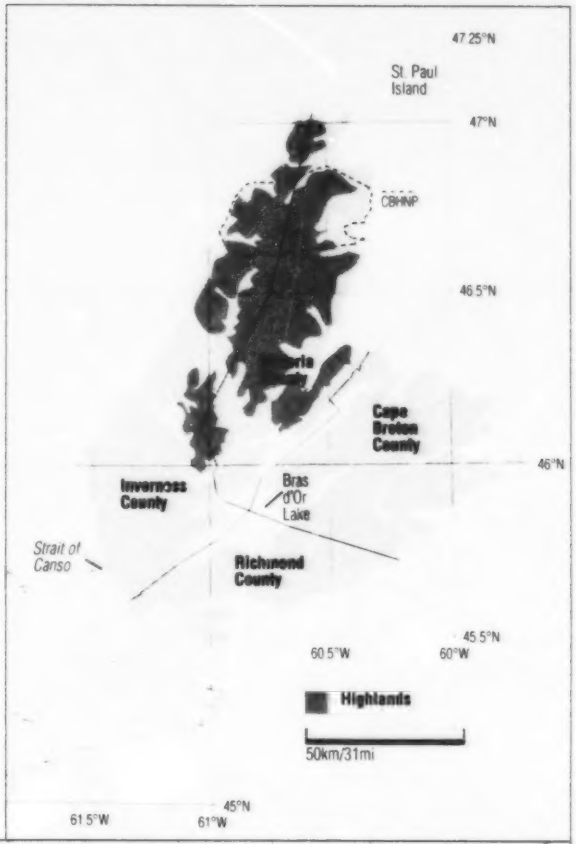
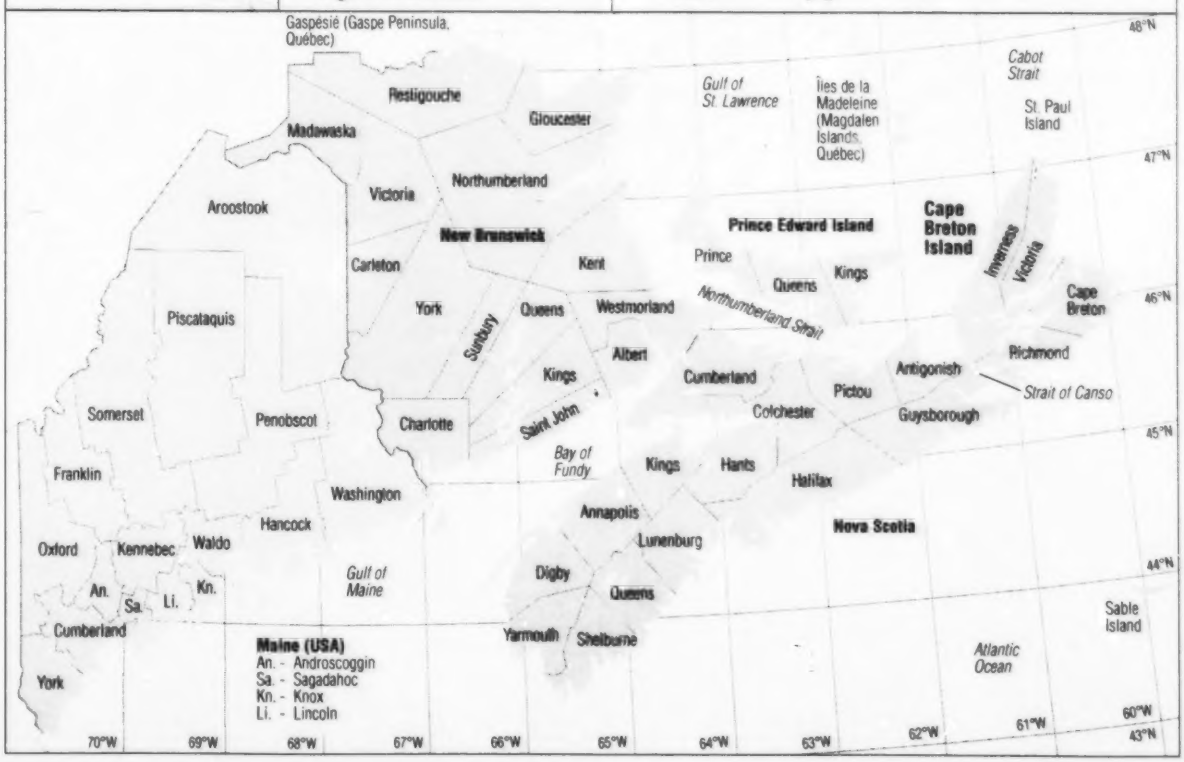


Figure 2: **Acadia**



The Cape Breton Highlands occupy ca. 25% of CBI, and are the principal exception to the steadily diminishing elevations from north to south in the Maritime Provinces. These Highlands are several plateaus of 300-525m (1000-1750ft), with low rolling hills on the top and deeply ravined, abrupt margins (Figure 4). They are provincial Crown Lands with the exception of Cape Breton Highlands National Park (CBHNP), and are composed principally of igneous and metamorphic rocks, and glacial deposits formed from these rocks, with little buffering capability and low productivity.

The plateaus are covered in boreal forest in which balsam fir *(Abies balsamea)* predominates, however in the early 1970's the mature forest was decimated by an infestation of spruce budworm *(Choristoneura fumifera)*. Re-growth has reached a crown height of less than 3m (10ft), and there remains extensive standing deadwood.

Figure 4: **The Plateau Escarpment**
Looking up the Wreck River valley from mid-way up the escarpment: the abrupt margins of the Highlands are evident.

Figure 5: **Standing Deadwood in the Highlands**
The remains of the mature forest after the spruce budworm infestation of the early 1970s. The low re-growth and customary strong winds on the plateau tend to give an impression of a more northern environment than is actually the case.

Natural lakes on the plateau tend to be small, shallow, and where not imbedded in a peatland they have gravel and cobble banks and bottoms. The odonate list for these lakes is similar to that for the larger peatland ponds. The flowages constructed for the Wreck Cove Hydroelectric Project have too great a seasonal water-level change to be viable for odonate larvae, and only wandering adults have been encountered at those flowages to date.

From the odonate perspective the most interesting aquatic feature of the Highlands are the ponds of the large, principally sloped, bogs or barrens found throughout, but which are most numerous and extensive at the higher elevations. While the most extensive barrens of this sort fall within CBHNP at the highest elevations on the plateau, the most accessible complex barren found to date is 'Everlasting Barren Bog' (Figure 6) just northeast of the Cheticamp Flowage dam. The east complex of this barren is quite complicated, with several sloped components, two domed components, and one extensive quaking bog (QB, Figure 6), the margin of a lake which is being invaded by the surrounding peatland.

The ponds in the barrens are of a number of types, from peat-bordered lakes such as that found in Cranberry Barren to the west, to firm-edged ponds characteristic of the domed bogs (c10, d6, Figure 6, also Figure 7) to merely wet depressions in the growing cover over the peat, 'flarks' reminiscent of those in 'string bogs' of the north (k7, i7, f13, Figure 6, also Figure 8) and there are indications of specific preferences of Odonata by type of pond, see Species Assemblages, page 11.

Also of interest on these bogs are the small streams which drain them, and which house a different odonate fauna from the ponds (notably mS, Figure 6, also Figure 10). These streams are slow-moving in the summer, but occupy comparatively deep valleys in the peat and are cut through the peat to the rock and gravel below – suggestive of considerable volume and current in the spring. The small stream valleys appear to give refuge to some species of the ponds, notably *Somatochlora septentrionalis*, from the very strong winds typically found on the plateau, particularly when those species are mating.

Figure 6: **'Everlasting Barren Bog', East Complex.**

Photo Courtesy of: Nova Scotia Geomatics Centre

nsSB - 'Northeast Sloped Bog'
mSB - 'Middle Sloped Bog'
sSB - 'South Sloped Bog'
nDB - 'North Domed Bog'
sDB - 'South Domed Bog'
QB - 'Quaking Bog' (floating)

nS - 'North Stream'
nwS - 'Northwest Stream'
neS - 'Northeast Stream'
mS - 'Middle Stream'
sS - 'South Stream'

Another interesting habitat, unique among those sampled to date on the plateau, is the fen which has formed in the constructed overflow channel of the Cheticamp Flowage dam, characterized by grassy emergents and cattail *(Typha latifolia)*.

The bulk of CBI is divided about equally between elevations of 150-300m (500-1000ft), termed Uplands, and Lowlands of less than 150m (500ft). The Uplands are often, but not exclusively, of the same rocks as the plateau and the Lowlands are diverse in bedrock, landform and climate. Both areas are similar to areas of New Brunswick at comparable latitudes, and have comparable aquatic habitats. There has been too little sampling in the Uplands and Lowlands to allow us to evaluate whether they have significantly different lists, and both will be referred to as Lowlands here.

It is probable that the narrow strip of Lowlands between the northern plateau and the marine coastline is unique from an Odonata standpoint due to the seasonally high population density of vagile species.

Although the bulk of CBI was covered in the most recent ice age, there is some evidence that the Highlands protruded above the ice and/or were free of it considerably before the balance of the island and province (Pielou 1991). Whether conditions were such as to sustain an Odonate population throughout the ice age is unknown, but it seems highly unlikely.

Figure 7: **The Firm-edged Ponds of 'Everlasting Barren Bog' (location ca. d10 Figure 6)**
These ponds are the habitat of *Aeshna canadensis, A. eremita, A. subarctica, A. umbrosa, Cordulia shurtleffi* and *Somatochlora cingulata.*

Figure 8: **The Flark Ponds of 'Radio Tower Bog 1', North Mountain, CBHNP.**
These particular ponds are in the 'ladder' configuration found in narrow sloped bogs, and are similar to those found on 'Everlasting Barren Bog' at about k7, k8, Figure 6; they are the habitat of *Aeshna sitchensis* and *Somatochlora septentrionalis.*

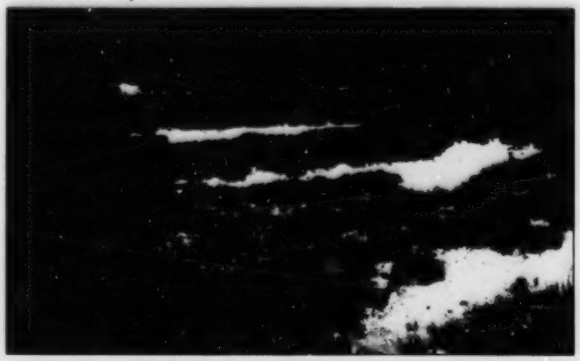


Figure 9: **A Flark Pond of 'Radio Tower Bog 2', North Mountain, CBHNP.**
This particular pond, flark-like but in a domed bog and filled with grassy emergents, is a preferred ovipositing site for *Somatochlora septentrionalis.*

Figure 10: **'Middle Stream' of 'Everlasting Barren Bog' (mS, ca. c8, d8, Figure 6)**
This is the largest of the streams which drain the barren; shown below is a comparatively narrow section where the Krummholz (dwarf coniferous growth) approaches the stream closely on the left, other sections having wide grassy banks such as that on the right, on both sides. This is the habitat of *Somatochlora minor,* and *Aeshna umbrosa,* and the larval habitat of *Cordulegaster diastatops,* although adults of the latter have not been encountered on the streams.

Methods

Acquiring information on the odonates of CBI has fallen into three categories of effort.

Research

The research into what information was already known on the subject entailed the review of formal and informal publications, cataloguing of collections, and canvassing of contemporary collectors for their specimen data.

The bulk of this had been done during the preparation of Brunelle (1997a). Collections assessed for that purpose which contained material from CBI were the Canadian National Collection of Insects (CNCI), the Nova Scotia Department of Natural Resourses Insectary (DNRI), the Nova Scotia Museum (NSM), and the Royal Ontario Museum (ROM).

During the current project the student collections of the University College of Cape Breton were determined and catalogued. Another substantial collection which had not been dealt with previously was the odonate component of the Biosystematics Research Center (BRC) collection from Cape Breton Highlands National Park, apparently the basis for Martin and Allyson (1987), and deposited at CNCI. Preliminary assessment found this collection to be largelly undetermined or misdetermined, and Raymond Hutchinson was retained to confirm and catalogue it, with significant specimens also confirmed by myself.

Contemporary collectors contributed substantially to the data.

Valuable work has been done in 1996 by Randy Lauff, St. Francis Xavier University, through a Nova Scotia Museum Research Grant (Lauff 1996) and independently since.

In 1997 Dan Banks and Dan Anderson of the Nova Scotia Department of Natural Resources, Baddeck (DNRB), acquired an interest in Odonata and have since collected extensively.

Robert Harding, and his sons Jacob and Jordan; Oliver Flint, Smithsonian Insitution; and Günther Peters, Univeristy of Berlin, have recently collected on CBI.

In addition to the Parks Canada commission in 1997, I surveyed on CBI in 1998 through a grant from the Nova Scotia Museum (Brunelle 1998b).

With the inclusion of these data it is thought that virtually all records of the order which have been taken as of 1998 on CBI are included in the information presented here. In addition, highlights of 1999 collections are presented.

Field

Field work by myself entailed the collection, recording, and preservation of specimens.

I surveyed on CBI, predominantly in the Highlands, for approximately 26 days from 1996 to 1998. Inclement weather was a limiting factor in the success of this program, and specimens were taken on only 17 (65%) of the field days – an aspect of surveying the Highlands which should be taken into account in planning future efforts. During this field work 180 records (18% of the 1016 records as of 1998) were acquired, and this is the basis for the first assessment of species status beyond simple presence, as label and published data on the bulk of the previous records is cursory at best.

Twenty-two Highland sites were sampled to varying degrees, mostly along Highland Road, which runs up the middle of the northern plateau from Hunter Mountain to the Cheticamp Flowage area. A number of streams, stillwaters, and beaver ponds were sampled along the road, as were the artificial flowages associated with the Wreck Cove Hydroelectric project. Natural lakes were sampled in the Highlands Road area, and also Paquet and French lakes along the north and west Cabot Trail. The one fen encountered in the Highlands, at the northern end of the Cheticamp Flowage dam, yielded some interesting specimens.

Principal emphasis in surveying habitat was on the extensive sloped bogs, particularly 'Everlasting Barren Bog' north of Cheticamp Flowage (Figure 6), but also Cranberry Barren to the west of it, and the 'Radio Tower Bogs' on North Mountain just southwest of the radio tower adjacent to the Cabot Trail.

Thirteen sites were sampled in the Lowlands, selected along the travel route to the Highlands on the basis of habitat; with small rivers, streams and cattail ponds predominating, although the small bog and fen complex 14km (8.7mi) from the Canso Causeway bridge beside Highway 105 proved extremely interesting. MacDonalds Pond on the east side Cabot Trail south of Wreck Cove proved abundant and diverse in odonates. In 1998 'North Forchu Bog' on the east coast was visited, the only substantial peatland known to have been sampled in the Lowlands.

Larvae were collected from the various habitats and preserved by killing in water just off the boil (< 5 seconds), 24 hours in full-strength formalin and maintenance in 70% ethanol and water. This method yields firm specimens with little tendency to bloat. Larval collections were few, and largely confined to the barrens ponds and streams.

The bulk of collection was of adults, which were taken with a hand net and maintained in collection envelopes, killed by acetone immersion, positioned, dried by 24 hours in acetone, air dried and stored in transparent envelopes. This method maintains the colours of the insects as well as can be done in the field.

Site, habitat and environmental conditions notes were taken both on site visit forms and on the specific collection envelopes.

Laboratory

Preserved specimens were determined to species using principally the keys in Walker (1952, Zygoptera; 1958, Anisoptera, Aeshnidae, Gomphidae, Cordulegastridae), Walker and Corbet (1975, Anisoptera, Macromiidae, Corduliidae, Libellulidae), and Westfall and May (1996, Zygoptera).

Determination, site, habitat and collection data and notes were entered into a semi-relational database in the software Filemaker II in Macintosh hardware. Abstracted information was entered into geographical and temporal distribution databases.

Results and Discussion

There are 1016 records as of 1998 of odonates for CBI; this equals one record for every 9km^2 (3.5mi^2) – indicative of the low level of our knowlege of this group on CBI, though comparing favourably with the ratio of 11.3/km^2 (4.4mi^2) for mainland Nova Scotia (43,673km^2, NSDD 1986). Tables 2 and 3 give data on records from CBI and the region.

The list for CBI now stands at 85, of which 24 (28%) have not previously been published; the damselflies *Lestes congener, L. eurinus, L. forcipatus, L. rectangularis, Chromagrion conditum, Ischnura posita,* and the dragonflies *Aeshna sitchensis, A. subarctica, A. tuberculifera, Boyeria vinosa, Gomphaeschna furcillata, Gomphus borealis, G. descriptus, Didymops transversa, Macromia illinoiensis, Helocordulia uhleri, Somatochlora elongata, S. incurvata, S. tenebrosa, S. williamsoni, Libellula lydia, Sympetrum danae, S. rubicundulum,* and *S. vicinum.*

The Highlands, at ca. 25% of the area of CBI, currently have 345 (34%) of the records – indicative of the interest they have attracted recently (92% of the records for the Highlands have been taken since 1975).

Historical records generally lack sufficient detail to take analysis to the point of habitat type with any certainty.

Based on this low density of data, most conclusions made here must be considered very tentative.

History of Study

Table 1, page 2, summarizes the literature for the region.

Only 82 (8%) of the CBI records were taken before 1975, compared with 1236 (32% of 3863) for the mainland, and collection in the Highlands was very sparse until the last quarter of this century – this indicates that the study of odonates on CBI is increasing at a faster rate than elsewhere in the province, likely attributable both to the attraction of study in a comparatively unknown area, and to the recently improved access to the plateau.

Collection in the past tended to focus on well-travelled areas of the Lowlands; along the northwest shore of Bras d'Or Lake in the vicinity of Baddeck, the east and west coastal Lowlands adjacent to the plateau, and most recently in the vicinity of Sydney by students of UCCB. Past collection in the Highlands was confined to the Cabot Trail route.

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Table 2: **Regional Synopsis of Data**

| | | |

Table 2: **Regional Synopsis of Data**

| | | |

Faunal Relationships in the Region

The initial impetus to study on CBI came with the discovery of J.H. McDunnough's specimen of *Somatochlora septentrionalis* from the Highlands, a species not known at that time elsewhere in Acadia. This had raised the prospect of a northern or boreal fauna in the Highlands unique in the Maritimes, however in 1998 Stuart Tingley discovered *S. septentrionalis* in northern New Brunswick, only slightly above the latitude of CBI (Brunelle 1999a) so that the CBI population can be considered disjunct only in being isolated from the rest of the species' range by the Gulf of St. Lawrence. Nevertheless, the species has its most southern known locale on CBI, even in Québec it is currently known no further south than 48°N (Pilon and Lagacé 1998), and it is likely more abundant in the Cape Breton Highlands than in northern New Brunswick as its habitat of ponded peatlands is common on CBI but comparatively rare in northern New Brunswick due to that area's mountinous topography.

That the Cape Breton Highlands is geographically a disjunct boreal region, with greater faunal affinity to Newfoundland and northern New Brunswick than to the adjacent Lowlands or to mainland Nova Scotia, is further indicated by the presence of *Somatochlora albicincta*, of similar regional distribution to *S. septentrionalis*.

Further evidence of the boreal nature of the Highlands comes from the great abundance of the northern species *Aeshna sitchensis* and *A. subarctica*, species which are rarely encountered, and not usually in abundance, to the south.

Until recently the presence of *Somatochlora brevicincta* would have been considered proof of a boreal environment as it was known only at about 50°N in Québec (Robert 1954), however it has recently been taken at a comparatively low latitude and elevation in New Brunswick (Brunelle 1999a) and one individual has been collected in Cumberland County, Nova Scotia (Brunelle 1998a) – the species therefore falls into the same distribution category as the *Aeshna sp.* mentioned above; largely northern but with small disjunct populations in appropriate habitats in the south.

Nine northern species are not currently known on CBI, *Coenagrion interrogatum, C. resolutum, Aeshna juncea, A. septentrionalis, Boyeria grafiana, Ophiogomphus colubrinus, Somatochlora franklini, S. whitehousei,* and *Leucorrhinia patricia,* and considering the harshness of the Highlands weather, similar to that which these species are adapted to in the north, they are possibly present in the Highlands. Only the Gulf of St. Lawrence between CBI and northern areas is an impediment to the presence of these species, and it is likely that the distances involved are not barriers to colonization. Wind patterns during the flight season likely make odonate flight to or from Newfoundland somewhat difficult, but the annual migration to that island of *Pantala flavescens* indicates that it is not impossible, and the prevailing winds probably facilitate flight from Îles de la Madeleine, Prince Edward Island, New Brunswick and eastern Québec.

The basically southern fauna of the lowlands is of similar diversity and composition to other areas of the Maritimes at comparable latitudes, although a number of species are represented by very few records, suggestive of low abundance. In common with most other areas in the Maritimes, the disparity between the lists of well-collected counties and those poorly collected (Table 2) suggests that there are further species to be found in the Lowlands. The mainland counties adjacent to Cape Breton, Antigonish and Guysborough, are among the least collected in the Province, and hence cannot be used to estimate the fauna of CBI, however Cumberland County currently has 71 species and its list is likely representative of the fauna of the Lowlands.

The records of the basically southern species *Gomphus borealis* and *G. descriptus* on CBI are surprising given how little is known of those species in mainland Nova Scotia, however both species are found at higher latitudes in Québec (Pilon and Lagacé 1998).

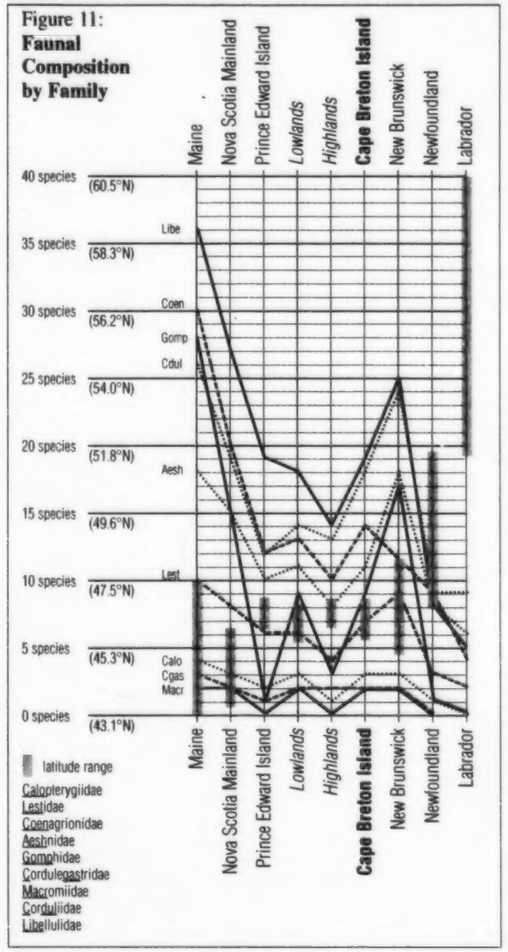

Figure 11: **Faunal Composition by Family**

Species Assemblages

Based on the information available, there are indications of well-defined species assemblages associated with particular habitats in the Highlands.

There appear to be two stream assemblages; one of the non-peatland streams which run through the forest on the plateau is comprised principally of *Aeshna umbrosa, Somatochlora elongata* and *Cordulegaster diastatops*, although *Aeshna eremita* and *Somatochlora minor* have occasionally been taken at those streams. The other stream assemblage is on those streams which drain the barrens, in which *Somatochlora minor* is the principal species and *Cordulegaster diastatops* apparently oviposits, based on larval collection. In this habitat *Aeshna umbrosa* males are common late in the flight season, although there is as yet no evidence that the species lays there. The large stream adjacent to 'Everlasting Barren Bog' ('Everlasting Barren Bog Stream', a1-a16, Figure 6) appears to fall into this latter category although it does not flow through the barren itself.

There are a further two assemblages at the ponds of the sloped and domed bogs of the barrens. *Aeshna sitchensis, Somatochlora septentrionalis,* and *Leucorrhinia hudsonica* are largely confined to the flark ponds (such as those at k7, k8, Figure 6, also Figure 8). An *S. septentrionalis* female was taken ovipositing off the quaking margin of the large pond at g4 (Figure 6) on August 28 1997, currently the latest flight record for the species on CBI. This may have been opportunistic laying when the normal population of that pond (see assemblage below) had been reduced, particularly as adults of the species have not been seen at that location otherwise, even during the height of its flight at nearby flark ponds.

The other barrens pond assemblage is found at the firm-edged ponds of the domed portions of the bog (c6, c10, Figure 6, also Figure 7), comprised of the species *Lestes disjunctus, Aeshna canadensis, A. eremita, A. subarctica, A. umbrosa, Cordulia shurtleffi, Somatochlora cingulata,* and *Leucorrhinia glacialis*. This is also the fauna of the quaking margined pond mentioned before, however that pond also has *Enallagma boreale* and *E. c. cyathigerum* associated with its floating plant beds *(Nuphar sp.),* rare in the other ponds of the barrens.

Influence of Elevation on Distribution

There are no indications that elevation directly constrains the distribution of southern species on the plateau; however it is likely that the shorter period of weather suitable for breeding in the Highlands does reduce both their presence and abundance. Odonata are greatly dependent upon sunlight and warmth for the completion of their adult lifestage with successful breeding, and the order is far more diverse at lower latitudes (Figure 11). The success of some species at high latitudes is due in part to their ability to complete their mating and laying within a short seasonal time-frame, however they are also competitive in austere environments such as peatlands and acidic fens, and their larvae are adapted to long winters.

It is probably the factor of habitat which most discriminates the Highlands – the extensive sloped bogs form as a function of the short summer, the plant material has insufficient time to break down and hence accumulates into a matt of peat which isolates the ponds from most nutrients. These habitats are not suited to species evolved for more diverse and nutrient-rich aquatic habitats, such as cattail ponds. The latter habitats are rare on the plateau, as are rivers, streams and lakes with extensive macrophyte beds – all the habitats which are most commonly those of southern species.

Synopsis of Species

Table 3 gives summary information for all species known from the Island. A nomen with an asterix (*) indicates a previously unpublished addition to the CBI list.

1 **Abundance** – This column gives the abundance of species in the Maritime Provinces\Cape Breton Island; **c** indicates that the species is commonly encountered and abundant, **u** that the species is rarely encountered.

2 **Habitat** – These columns indicate habitats at which the species has been found in the region.

3 **Distribution** – The first column indicates the general distribution of the species with respect to CBI; a lower case letter indicates that the range does not extend far in, or that abundance is low in, that direction; **S** indicates southern, **N** indicates northern, **M** indicates a migratory species from the south, possibly not overwintering as larvae on CBI.

The following columns indicate presence in New England and Atlantic Canada, the data on Atlantic Canada, Maine and New Hampshire is current based on the author's recent research, and that on Québec is largely derived from Pilon and Lagacé (1998). Data for the four other New England states is likely complete, but there has been no faunal summary for them in some time.

In the CBI columns the number of records per species is given, also the number of records for the Lowlands and Highlands. A bullet (•) in these columns indicates a report in the literature with no record details.

4 **Flight** – The right series of columns give known flight for each species as the number of records for each period in a Lowlands\Highlands format. The gray bars show the known flight period in the Highlands (upper, dark gray) and Lowlands (lower, light gray). Bold entries fall in the summer period.

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Table 3: **Specific Regional Data**

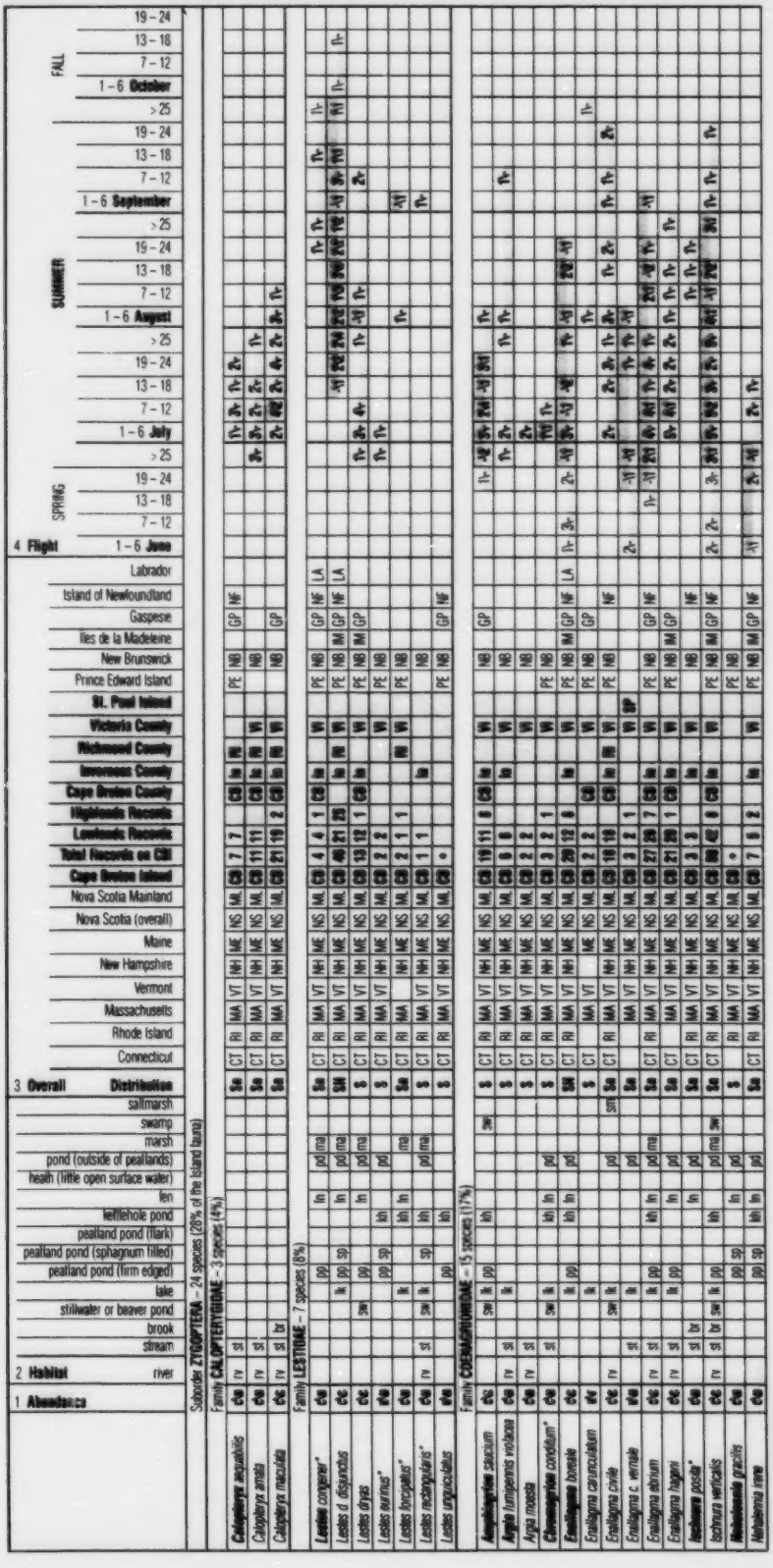

Table 3: **Specific Regional Data**

| 1 Abundance | | |

Table 2: ***continued***

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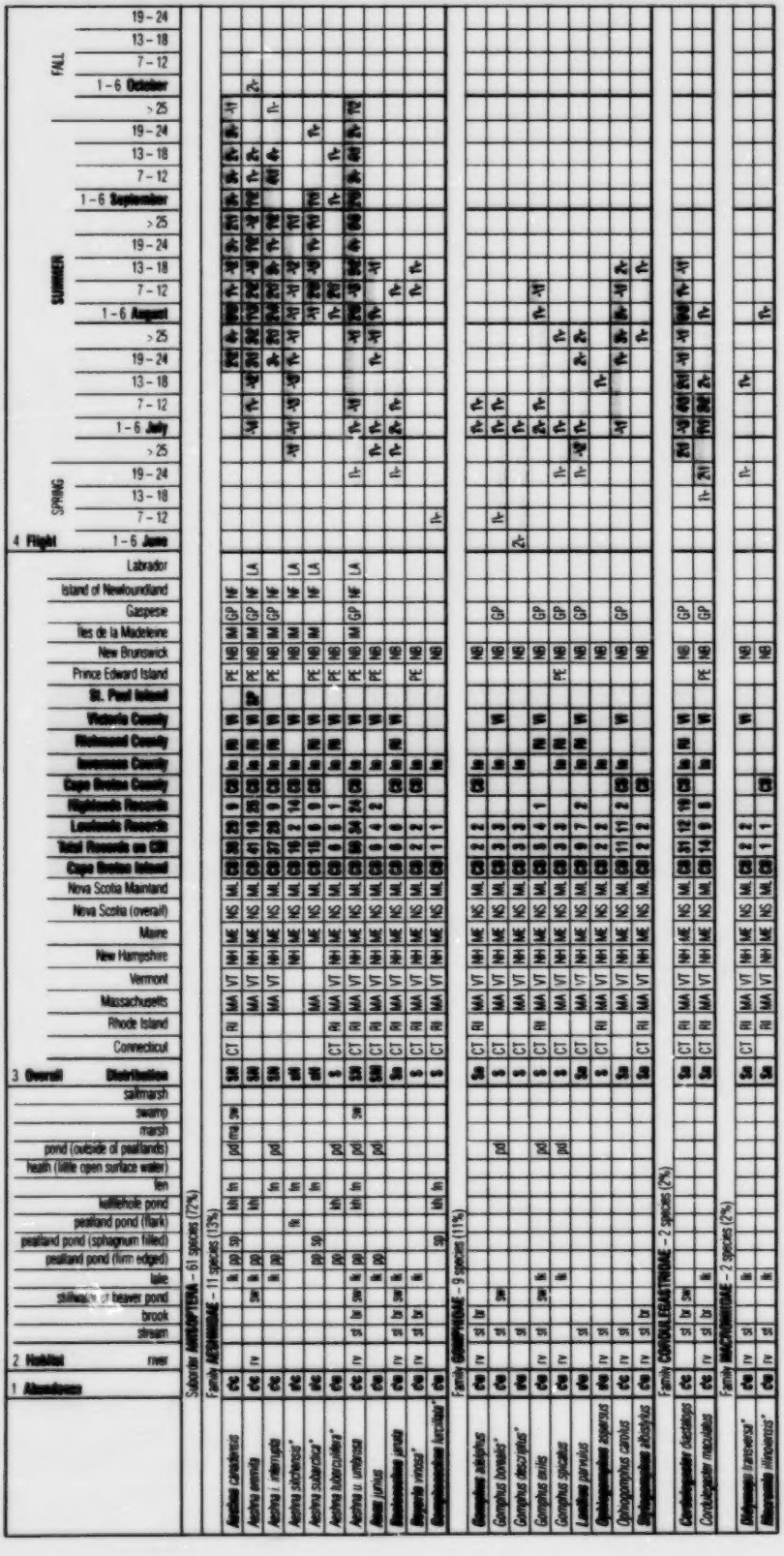

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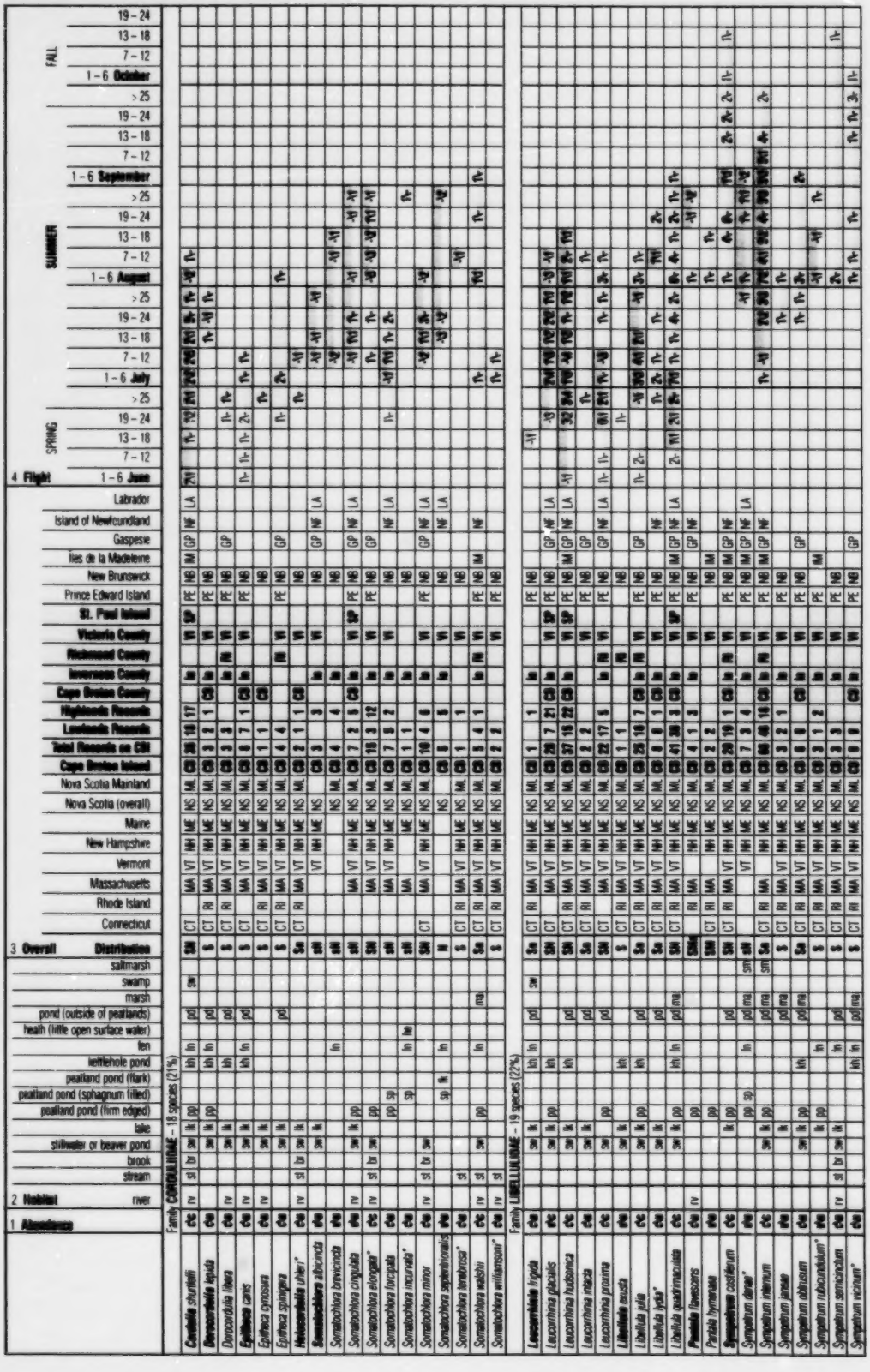


Species Accounts

The following are discussions of each of the species currently known from CBI.

The English names given are from Paulson and Dunkle (1996); the French from Pilon and Lagacé (1998), where the species is reported from Québec.

The 'First' section indicates the first records of the species on Cape Breton Island, in the Lowlands (LL), and Highlands (HL) – if published the reference is noted, if first published here, the year, collector, and collection (if any) are noted in brackets.

The current listing of species is then given.

Global and Canada status are those of The Nature Conservancy (TNC), United States National Office. In the TNC ranking system the lower the number, the higher is the perceived rarity, and hence conservation interest. A status of 4 or 5 indicates species for which there are no conservation concerns at present.

Nova Scotian status is that of the Nova Scotia Department of Natural Resources (NSDNR), Wildlife Division, Species at Risk Group (Elderkin 1999), and are currently in draft status. The NSDNR ranking system is four-part; red and yellow status indicates species for which there is currently conservation concern in the province, and green indicates species for which there is currently no concern. 'Indeterminate' status indicates that there is conservation concern but that there has been insufficient study as yet to assign a colour status.

Following listing information, general comments on appearance and behaviour of the species are given, with particular attention to discriminating similar species which are, or might be, present on CBI.

Lastly, record information on the species is given which is complete as of 1998. 1999 data is given only for species first discovered on CBI during that year. Data for each record is; the site name, the map book (Nova Scotia 1992) grid reference, decimal latitude and longitude, date, collector, reference, and collection. Distances along Highland Road refer to those from the Hunters Mountain gate at the south end.

Collection's names given as initials are: **CNCI**, Canadian National Collection of Insects, Ottawa; **DNRB**, Nova Scotia Department of Natural Resources, Baddeck; **DNRI**, Nova Scotia Department of Natural Resources, Insectary, Shubenacadie; **NSM**, Nova Scotia Museum, Halifax; **ROM**, Royal Ontario Museum, Toronto; **UCCB**, University College of Cape Breton, Sydney.

Collector's names given as initials, with the collections their material is deposited at, are: **BW**, B. Wright, NSM; **DA**, D. Anderson, DNRB; **DB**, D. Banks, DNRB; **EW**, E.M. Walker, ROM; **JEM**, J.E.H. Martin, CNCI; **JM**, J.H. McDunnough, NSM; **MS**, M. Smith, University of Massachusetts, Amherst; **OF**, Oliver Flint, Smithsonian Insitute, Washington; **PB**, P.M. Brunelle; **RL**, R.A. Layberry, CNCI; **RM**, R.J. Martin, CNCI; **RSM**, R.S. MacDonald, UCCB; **ST**, S. Tynski, UCCB; **TF**, T. Freeman, CNCI.

ORDER **ODONATA** – Damselflies and Dragonflies

SUBORDER **ZYGOPTERA** – Damselflies

The damselflies are generally smaller and always slimmer than the dragonflies. Adults have forewings and hindwings of similar size and shape, and when perched the wings are held more or less together over the back. Larvae have three caudal lamellae (feather-like external gills) at the end of the abdomen.

FAMILY **CALOPTERYGIDAE** – Jewelwings

Genus ***CALOPTERYX*** – Jewelwings

The jewelwings are the largest damselflies of the northeast, inhabitants of running waters which have streaming vegetation in which the females lay their eggs. The males are iridescent green and readily discriminated by the markings of the wings, the females are bronze and less easy to identify to species. Males are unique in our fauna in that they lack pterostigma (small coloured tabs at the front of the wings near the apex). The other genus in the family, *Hetaerina*, is not known further northeast than southern Maine.

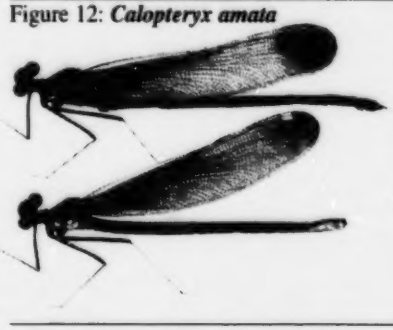
Calopteryx aequabilis Say 1839

River Jewelwing
caloptéryx à taches apicales
First: CBI and LL (Brunelle 1997a).
Global: G5
Canada: N5
Nova Scotia: Green Status

The river jewelwing is found in rapid running waters, but also occasionally slow-running vegetated streams and rivers. It is surprising that this species, the only one of its family known from Newfoundland and very common throughout the Maritimes, has not been more frequently encountered on CBI, or found in the Highlands. Males have black-tipped wings, females slightly tinted wings with slightly darker tips, both characters variable, and can be discriminated from *C. amata* by the latter's narrower wings.

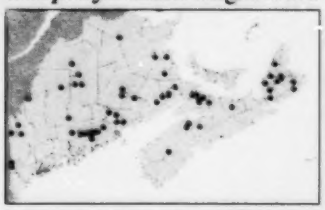
CAPE BRETON CO. • Sydney, 43b3, 46.13N, 60.17W, July 8 1995, G.R. Macpherson, UCCB; **INVERNESS CO.** • Brook Village, 33d4, 46.05N, 61.3W, July 19 1998, DA • McCormick Corner, 33d3, 46.16N, 61.28W, July 19 1998, DA • River Denys, gypsum quarry, 34d2, 45.81N, 61.23W, July 3 1998, DB • River Inhabitants, 34d3, 45.78N, 61.32W, July 13 1998, DB • Trous Mederick, 1km (0.62mi) east of Grand Étang, 37a4, 46.55N, 61.02W, July 7 1996, OF; **RICHMOND CO.** • River Inhabitants, 34d4, 45.78N, 61.32W, July 8 1990, J. Gilhen, NSM.

Figure 12: ***Calopteryx amata***



Male (above) and female. The wings of calopterids are not greatly stalked. Note the ovipositor at the end of the female's abdomen, all damselflies insert their eggs into plants.

Calopteryx amata Hagen 1890

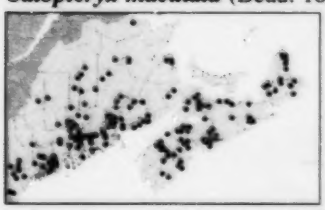


Superb Jewelwing
calopteryx élancé
First: CBI and LL (Brunelle 1997a).
Global: G4
Canada: N4
Nova Scotia: Green Status

The superb jewelwing is generally found at larger running waters. This is the largest species of the genus in the Maritimes and the CBI specimens represent the furthest eastern population, although the species is found higher in New Brunswick and has isolated populations throughout. Males have amber hindwing tips, females can be dramatically bronze.

CAPE BRETON CO. • Trout Brook, 4km (2.5mi) up from Mira River, 43b5, 45.95N, 60.17W, June 27 1994, R. Harding • Upper Grand Mira, 44b2, 45.8N, 60.28W, July 6 1995, J.M. Francis, UCCB • Big Brook, 34d2, 45.81N, 61.23W, June 26 1998, DA; **INVERNESS CO.** • Mull River, 33c5, 46.0N, 61.37W, July 15 1998, DA • Southwest Margaree River, near Upper Margaree, 33e3, 46.2N, 61.13W, July 25 1998, G. Peters • River Denys, gypsum quarry, 34d2, 45.81N, 61.23W, July 3 1998, DB • Trous Mederick, 1km (0.62mi) east of Grand Étang, 37a4, 46.55N, 61.02W, July 7 1996, OF; **RICHMOND CO.** • River Inhabitants, 34d4, 45.78N, 61.32W, July 17 1992, J. Callahan, NSM; **VICTORIA CO.** • Baddeck, 38c4, 46.1N, 60.77W, July 3 1936, JM • Big Farm, 38b4, 46.11N, 60.82W, July 9 1998, DA • Peter Brook, Baddeck, 38c3, 46.17N, 60.75W, June 26 1936, TF.

Calopteryx maculata (Beau. 1805)



Ebony Jewelwing
calopteryx bistré
First: CBI and LL (Walker 1933), HL (1983, R.A. Layberry, CNCI).
Global: G5
Canada: N5
Nova Scotia: Green Status

The ebony jewelwing is found at running waters of all sizes, often with its congeners. It is the most common species of the genus in the region and often abundant in association with burreed *(Sparganium sp.)*. Males have fully ebony wings, the female's are gray with white pterostigma.

CAPE BRETON CO. • East Bay, 43a5, 46.0N, 60.42W, August 4 1993, S.R. Mackie, UCCB • Sydney, 43b3, 46.14N, 60.17W, July 24 1914, EW. Walker 1933, ROM • University College of Cape Breton campus, Sydney, 43b3, 46.13N, 60.17W, July 24 1985, July 25 1985, August 12 1985, ST. July 17 1991, A. Gillis, UCCB • Upper Grand Mira, 44b2, 45.8N, 60.28W, July 6 1995, J.M. Francis, UCCB; **INVERNESS CO.** • Brook Village, 33d4, 46.05N, 61.3W, July 19 1998, DA • Morley's Brook, 34d2, 45.84N, 61.2W, July 8 1998, DA • Southwest Mabou, 33c5, 46.0N, 61.37W, July 8 1998, DA; **RICHMOND CO.** • River Inhabitants, 34d4, 45.78N, 61.32W, July 17 1992, J. Callahan, NSM; **VICTORIA CO.** • 0.3km (0.2mi) west of Round Lake, CBHNP, 37d1, 46.81N, 60.51W, July 10 1983, RL • Baddeck, 38c4, 46.09N, 60.76W, August 6 1998, DB • Estemere, 39a1, 45.94N, 60.97W, July 10 1998, DA • freshwater marsh, 0.1km (0.06mi) north of Freshwater Lake, CBHNP, 37e3, 46.64N, 60.42W, July 6 1983, RL • MacDonalds Pond, Cabot Trail, 37e5, 46.39N, 60.51W, August 3 1997, PB • Peter's Brook, Baddeck, 38c3, 46.15N, 60.77W, July 22 1998, DA • Plaister Mines, 38c3, 46.14N, 60.67W, July 29 1998, DA • Rear Estmere, 39a1, 45.94N, 60.96W, July 10 1998, DA • Round Lake, CBHNP, 37e1, 46.81N, 60.51W, July 10 1983, RL • Warren Lake, CBHNP, 37e2, 46.72N, 60.4W, Martin and Allyson 1987.

FAMILY LESTIDAE – Spreadwings

Genus *LESTES* – Spreadwings

Lestes is a common genus, larger than the pond damsels and in length, though not bulk, approaching the jewelwings. The common name comes from their stance of perching with the wings slightly spread, unlike most other Zygoptera. Lestes are generally associated with slow and still waters, although some species can be found at the slow margins of running waters. Determination to species must be by the keys, although a few species can be recognized in the field.

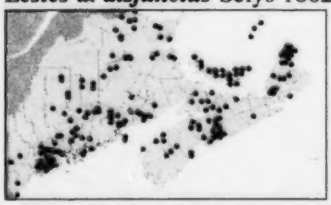
Lestes congener Hagen 1861

Spotted Spreadwing
lestes tardif
First: CBI and LL (1991, K. Crane, UCCB), HL (1999, D. Anderson, DNRB).
Global: G5
Canada: N5
Nova Scotia: Green Status

This is a species of late flight at sphagnum bog ponds, acidic fens, marshes, and probably cattail ponds. Its absence at the peat bog ponds of the Highlands was surprising, given its habitat preference and presence in Newfoundland. The spotted spreadwing can be recognized by dark spots on the light posteroventral thorax.

CAPE BRETON CO. • Lingan, 43c2, 45.23N, 60.03W, September 14 1991, K. Crane, UCCB; **INVERNESS CO.** • Seal Cove, 34e1, 45.86N, 61.1W, August 21 1998, DA • sphagnum bog, Highway 105, 14km (8.7mi) north of Canso Causeway bridge, 34c3, 45.77N, 61.33W, August 27 1997, PB; **VICTORIA CO.** • Big Harbour Trout Pond, 38d3, 46.15N, 60.63W, September 29 1998, DB • Mathesons Lake Road, 38c2, 46.23N, 60.67W, September 18 1999, DA.

Lestes d. disjunctus Sélys 1862



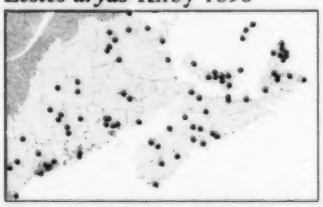
Common Spreadwing
lestes disjoint
First: CBI and LL (Walker 1933), HL (1953, D.C. Ferguson, NSM).
Global: G5
Canada: N5
Nova Scotia: Green Status

The common spreadwing is the most abundant species in the region, found in diverse slow-water habitats, particularly ponds. On CBI it was the most numerous damselfly species at the firm-edged ponds of Everlasting Barren during 1997.

INVERNESS CO. • Benjies Lake, Mackenzie Mountain, CBHNP, 37b2, 46.74N, 60.81W, August 10 1984, JEM, RM • Big Brook, 34d2, 45.81N, 61.23W, September 11 1997, DA • bog, Cabot Trail, 1.1km (0.7mi) southwest of radio tower, North Mountain, CBHNP, 37c1, 46.82NN, 60.67W, August 8 1984, CNCI • bog, Cabot Trail, at 'Bog Trail' head of trail, CBHNP, 37b2, 46.74N, 60.83W, August 29 1997, PB • Cranberry Barren, CBHNP, northwest of Cheticamp Flowage Dam, 37c2, 46.67N, 60.7W, August 20 1997, PB • Eden, 34e2, 45.85N, 61.12W, August 12 1997, DB • Fishing Cove Lake, CBHNP, 37b2, 46.71N, 60.84W, August 18 1984, JEM • French Lake, CBHNP, 37b2, 46.73, 60.85, August 18 1984, RM • Glenora, 34d3, 45.74N, 61.32W, September 10 1997, DA • Jim Campbell Barren, 37b4, 46.56N, 60.89W, August 8 1998, DA • North Mountain, 36d5, 46.88N, 60.58W, August 2 1953, DF, August 15 1983, JEM, RM, August 24 1983, M. Sharkey, CNCI, August 15 1984, JEM, RM • 'Radio Tower Bog 2', North Mountain, 0.5km (0.31mi) south of the Cabot Trail, CBHNP, 37c1, 46.8N, 60.67W, July 16 1998, PB • River Denys, gypsum quarry, 34d2, 45.18N, 61.23W, September 18 1997, DB • Rough Brook

Road, 33d3, 45.73N, 61.33W, July 24 1998, DB • sphagnum bog, Highway 105, 14km (8.7mi) north of Canso Causeway bridge, 34c3, 45.77N, 61.33W, August 1 1997, PB; **RICHMOND CO.** • Point Michaud, 39d4, 45.59N, 60.7W, August 21 1998, DA; **VICTORIA CO.** • Big Harbour, 38d3, 46.15N, 60.63W, July 21 1998, July 28 1998, August 26 1998, DB • Big Harbour Ducks Unlimited impoundment, 38d3, 46.15N, 60.63W, October 3 1997, DB • Big Harbour Ducks Unlimited marsh, 38d3, 46.15N, 60.63W, August 21 1997, DB • Big Harbour trout pond, 38d3, 46.15N, 60.63W, October 13 1997, DB • Birch Point, 38b4, 46.06N, 60.86W, September 7 1998, DB • bog, east of Park Spur, 37c4, 46.52N, 60.7W, July 23 1998, DB • 'Cape Breton Highlands', 37d3, 46.59N, 60.64W, July 25 1998, DA • Cow Bay, 38b4, 46.07N, 60.89W, September 28 1997, DB • Dingwall, Aspy Bay, 36e5, 46.89N, 60.57W, July 27 1919, A.G. Huntsman, Walker 1933 • 'Everlasting Barren Bog', northeast of Cheticamp Flowage dam, 37c2, 46.67N, 60.65W, August 2 1997, August 28 1997, September 6 1997, PB • Highland Road, Mile 29 (47km) from Hunter Mountain, 37c4, 46.52N, 60.7W, July 30 1998, DA • Jigging Cove Lake, CBHNP, 42a1, 46.78, 60.33, August 15 1996, PB • MacDonalds Pond, Cabot Trail, 37e5, 46.39N, 60.51W, August 3 1997, PB • MacNaughton's Brook, Keppoch, 38a4, 46.1N, 61.02W, September 14 1998, DA • Morrison Point, Cow Bay, 38b4, 46.07N, 60.89W, August 17 1997, DB • Paquets Lake, CBHNP, 37e1, 46.83N, 60.43W, August 14 1983, JEM, RM, September 25 1991, BW, August 15 1996, PB • Ronnie's Lake Road, 37c4, 46.48N, 60.67W, July 30 1998, DA, July 23 1998, DB • Warren Lake, CBHNP, 37e2, 46.72N, 60.39W, August 15 1984, JEM, RM • West Branch Indian Brook, 37c4, 46.54N, 60.78W, July 25 1998, DA.

Lestes dryas Kirby 1890



Emerald Spreadwing
lestes dryade
First: CBI and LL (Walker 1933 as *Lestes uncatus*), HL (1998, D. Anderson, DNRB).
Global: G5
Canada: N5
Nova Scotia: Green Status

The emerald spreadwing is a species of many types of slow waters, but most abundant in acidic habitats. The males are an iridescent green rivaling the jewelwings. The species is the second most common spreadwing on CBI.

CAPE BRETON CO. • Scatarie Island, 45a4, 46.0N, 59.75W, July 1 1917, A.G. Huntsman, Walker 1933 • University College of Cape Breton campus, Sydney, 43b3, 46.13N, 60.17W, August 7 1985, ST; **INVERNESS CO.** • Big Brook, gypsum sinkhole, Georgia Pacific Mine, 34d2, 45.81N, 61.23W, September 11 1997, DA • Pleasant Bay, 37b1, 46.84N, 60.82W, July 3 1954, DF; **VICTORIA CO.** • 3km (1.9mi) northeast of Baddeck Bridge, 38c3, 46.15N, 60.79W, July 11 1996, OF • Baddeck, 38c4, 46.10N, 60.77W, July 9 1936, JM • Big Barren, 38b2, 46.27N, 60.85W, August 1 1998, DA • Cabot Trail at Neils Harbour, CBHNP, 42a1, 46.82N, 60.35W, July 29 1917, A.G. Huntsman, Walker 1933, ROM • Cape North Village, 36e5, 46.88N, 60.5W, June 29 1996, D.B. McCorquodale, UCCB • Forks Baddeck, near, 38c4, 46.18N, 60.78W, July 7 1936, TF • freshwater marsh, 0.1km (0.06mi) north of Freshwater Lake, CBHNP, 37e3, 46.64N, 60.42W, July 6 1983, RL • Roper Brook, Ingonish, 42a2, 46.7N, 60.58W, July 10 1996, OF.

Figure 13: ***Lestes eurinus***

Male; note that the wings of the lestids are stalked, and generally clear.

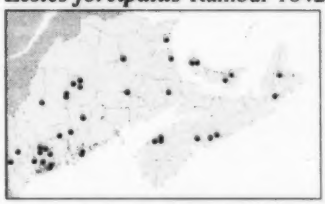
Lestes eurinus Say 1839

Amber-winged Spreadwing
lestes flamboyant
First: CBI and LL (1998, D. Anderson, DNRB).
Global: G4
Nova Scotia: Indetermined

This is another lestid species of acidic waters, surprising in its absence at the barrens ponds of the Highlands. It is the only species of lestid with amber-tinted wings, though sometimes lightly.

VICTORIA CO. • North Branch Plaster Pond, 38c3, 46.18N, 60.78W, June 27 1999, July 3 1999, DA.

Lestes forcipatus Rambur 1842



Sweetflag Spreadwing
lestes à forceps
First: CBI and LL (1998, D. Anderson, DNRB), HL (1998, D. Banks, DNRB).
Global: G5
Nova Scotia: Green Status

This species is difficult to discriminate from the common *L. d. disjunctus* without careful keying; this may account to some extent for its comparative rarity in the region.

RICHMOND CO. • bog, Highway 104, Cannes, 39a4, 45.64N, 60.98W, August 2 1998, DA; **VICTORIA CO.** • Big Barren, 38c3, 46.28N, 60.86W, September 2 1998, DB.

Lestes rectangularis Say 1839

Slender Spreadwing
lestes élancé
First: CBI and LL (1997, P.M. Brunelle).
Global: G5
Canada: N5
Nova Scotia: Green Status

A species of many types of slow waters, the slender spreadwing is the thinnest for its length of odonates of the northeast. On the mainland it is usually encountered in the protected and heavily vegetated backwaters of streams or rivers; its collection at the small sphagnum bog in southern Inverness County was somewhat surprising, with only one specimen being seen in many visits it was likely wandering from a nearby stream or river.

INVERNESS CO. • sphagnum bog, Highway 105, 14km (8.7mi) north of Canso Causeway bridge, 34c3, 45.77N, 61.33W, September 6 1997, PB.

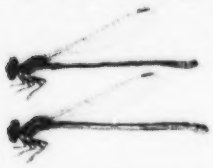
Lestes unguiculatus Hagen 1861

Lyretipped Spreadwing
lestes onguiculé
First: CBI (Walker 1953 as 'C.B.').
Global: G5
Canada: N5
Nova Scotia: Green Status

This is a species of peat bog and kettlehole ponds. No details have been found to substantiate the record in Walker (1953) of this species' presence on CBI, however the reference is credible.

FAMILY COENAGRIONIDAE – Pond Damsels

Figure 14: **Pond Damsels**



Male (above) and female. The wings of the pond damsels are stalked; males are generally blue and black, females brown or gray and black. Note the female's ovipositor.

Genus *AMPHIAGRION* – Red Damsels

Amphiagrion saucium (Burmeister 1839)

Eastern Red Damsel
agrion rougeâtre
First: CBI and LL (Walker 1953), HL (1983, R.A. Layberry, CNCI).
Global: G5
Canada: N5
Nova Scotia: Green Status

This is a species of slow waters, particularly peat bog ponds. The species is a brilliant red and is apparently more common on CBI than elsewhere in the region, although recently reported from mainland Nova Scotia and New Brunswick (Brunelle 1997a). Care should be taken not to confuse this species with the orange teneral form of *Ischnura verticalis*.

CAPE BRETON CO. • University College of Cape Breton campus, Sydney, 43b3, 46.13N, 60.17W, July 19 1985, ST; **INVERNESS CO.** • Ashfield, 34e1, 45.89N, 61.16W, August 5 1998, DA • bog 1.1km (0.7mi) southwest of radio tower, North Mountain, CBHNP, 37c1, 46.82N, 60.67W, July 8 1983, RL • Caribou Barrens, CBHNP, 37c2, 46.72N, 60.67W, July 23 1996, RL • Fishing Cove River, MacKenzie Mountain, CBHNP, 37b2, 46.75N, 60.83W, June 30 1983, RL • Jim Cambells Barren, 37b4, 46.57N, 60.92W, July 9 1997, RL • MacKenzie Mountain, 3.2km (1.9mi) east of Benjies Lake, CBHNP, 37b2, 46.74N, 60.76W, July 14 1983, RL • Whycocomagh Beach, 33e5, 45.97N, 61.13W, June 24 1966, BW; **VICTORIA CO.** • Baddeck, 38c4, 46.1N, 60.77W, July 1 1936, July 2 1936, July 7 1936, TF, July 8 1936, JM, July 20 1936, July 24 1938, TF, Walker 1953 • 'Cape Breton Highlands', 37d4, 46.55N, 60.57W, July 9 1998, DB • Mary Ann Falls Road, CBHNP, 42a1, 46.77N, 60.37W, July 2 1984, RL • Paquets Lake, CBHNP, 37e1, 46.83N, 60.43W, June 30 1983, RL • Wreck Cove Flowage, 37e4, 46.57N, 60.51W, July 9 1998, DA.

Genus *ARGIA* – Dancers

A genus of medium-sized damselflies, the dancers are generally smaller than most species of the previous two families, but larger than most other pond damsels. Dancer species are most diverse to the south of this region and in the tropics. Both species known from the Maritimes are found on CBI.

Argia fumipennis violacea (Hagen 1861)

Variable Dancer
argie violacée
First: CBI (Brunelle 1997a), LL (1954, R.D. Gray, NSM).
Global: G5
Canada: N5
Nova Scotia: Green Status

This is a species of running waters and the wave-washed shores of lakes. The male is a brilliant violet colour, its wings clear (subspecies to the south have smoky wings). It is likely this lovely species will be found to be common in the Lowlands. The female needs keying to discriminate it from *A. moesta*.

INVERNESS CO. • Big Brook, 34d2, 45.81N, 61.23W, September 11 1997, June 26 1998, DA • River Denys, gypsum quarry, 34d2, 45.81N, 61.23W, July 3 1998, DB; **VICTORIA CO.** • Baddeck, 38c4, 46.1N, 60.77W, July 6 1954, R.D. Gray, NSM • MacDonalds Pond, Cabot Trail, 37e5, 46.39N, 60.51W, August 3 1997, PB • Plaister Mines, 38c3, 46.14N, 60.67W, July 29 1998, DA.

Argia moesta (Hagen 1861)

Powdered Dancer
argie svelte
First: CBI and LL (Cook 1950 as *Argia moesta putrida*).
Global: G5
Canada: N5
Nova Scotia: Green Status

The powdered dancer is a species of running waters, particularly fast waters with emergent rocks. This large damselfly could easily be mistaken for a lestid, save for its very short terminalia ('claspers' at the end of the male's abdomen) – the lestid terminals are long and curved. The male powdered dancer has a dusty light gray thorax, the female is similar but has also sky blue showing low on the side of the thorax. Another species which will probably be found common in the Lowlands.

VICTORIA CO. • Baddeck, 38c4, 46.1N, 60.77W, July 6 1954, R.D. Gray, NSM • Washabuck, 38c4, 46.07N, 60.84W, July 1 1947, DF, Cook 1950.

Genus *CHROMAGRION* – Aurora Damsel

Chromagrion conditum (Sélys 1876)

Aurora Damsel
agrion à tache jaune
First: CBI, LL and HL (1983, R.A. Layberry, CNCI).
Global: G5
Canada: N5
Nova Scotia: Green Status

This attractive damsel is found at cattail ponds, marshes and vegetated lake margins. A large species, it is distinct from the 'bluets' or sky-blue damselflies of the region in that both genders have bright yellow markings on the posterolateral area of the thorax. It is common in the southern Maritimes, and probably more common on CBI than the three records suggest.

VICTORIA CO. • MacDougalls Lake. CBHNP. 37e2. 46.67N. 60.44W. July 2 1983. RL • freshwater marsh. 0.1km (0.06mi) north of Freshwater Lake. CBHNP. 37e3. 46.64N. 60.42W. July 6 1983. July 11 1983. RL.

Genus *ENALLAGMA* – Bluets

This is the dominant genus of its family in North America. All bluets known on CBI have sky-blue males and gray or brown females. The males can be determined to species in the field by the form of the terminals, however the females require reference to keys. Bluets are typically present in considerable numbers at slow and still waters, however *E. exsulans* (see Specific Exclusions, page 45) is an inhabitant of running waters.

Enallagma boreale Sélys 1875

Boreal Bluet
agrion boréal
First: CBI (Brunelle 1997a), LL (1936, J.H. McDunnough, CNCI), HL (1993, R.A. Layberry, CNCI).
Global: G5 *Canada:* N5
Nova Scotia: Green Status

The boreal bluet is a species of most slow waters; although common throughout the region it appears to be more abundant in the northern areas. Care should be taken in discriminating this species from the very similar *E. cyathigerum* subspecies; its superior terminals have a ventroapical notch when seen from the side, those of *E. cyathigerum* a small up-turned hook.

INVERNESS CO. • Ashfield. 34e1. 45.89N. 61.16W. June 2 1998. June 12 1998. DA • Big Brook. Georgia Pacific Mine. gypsum sinkhole. 34d2. 45.81N. 61.23W. June 11 1998. DA • Jim Cambells Barren. 37b4. 46.57N. 60.92W. July 9 1997. RL • 'Radio Tower Bog 2'. North Mountain. 0.5km (0.3mi) south of the Cabot Trail. CBHNP. 37c1. 46.8N. 60.67W. July 16 1998. PB • MacIntyre Mountain. 34c3. 45.77N. 61.35W. June 19 1998. DA; **VICTORIA CO.** • Baddeck. 38c4. 46.10N. 60.77W. June 23 1936. July 1 1936. JM. July 2 1936. TF. July 3 1936. JM. July 31 1936. TF • 'Everlasting Barren Bog'. northeast of Cheticamp Flowage dam. 37c2. 46.67N. 60.65W. August 2 1997. July 15 1998. PB • Jigging Cove Lake. CBHNP. 42a1. 46.78N. 60.33W. August 15 1996. PB • Paquets Lake. CBH. 37e1. 46.83N. 60.43W. June 30 1983. RL. August 14 1983. JEM. RM. August 15 1996. PB • Timber Lake. Marianna Road. north of Oregon. 38c1. 46.38N. 60.67W. August 21 1997. PB • Warren Lake. CBH. 37e2. 46.72N. 60.39W. August 15 1984. JEM.

Enallagma civile (Hagen 1861)

Familiar Bluet
agrion civil
First: CBI and LL (Walker 1933).
Global: G5
Nova Scotia: Green Status

This is a species of the larger ponds, lakes and the slower stretches of rivers. One of the more abundant damselflies in the region, it is large and very obvious as it flys close to the water surface.

CAPE BRETON CO. • Catalone Point. 43dD5. 46.01N. 59.94W. August 3 1998. DA • East Bay. 43a5. 46.0N. 60.42W. September 6 1991. T.M. Osborne. UCCB • 'North Forchu Bog'. likely wandering from Cricket Lake. Gabrus Lake to North Forchu road. north of North Forchu. 44b3. 46.25N. 59.27W. July 17 1998. PB • North Sydney. 43b2. 46.2N. 60.27W. September 20 1992. C. Allison. UCCB • University College of Cape Breton campus. Sydney. 43b3. 46.13N. 60.17W. July 3 1991. D. Slade. UCCB; **INVERNESS CO.** • Fiset Brook (as 'Plateau River'). Cheticamp. 37a3. 46.6N. 61.02W. August 4 1917. A.G. Huntsman. Walker 1933 • Glenora. 34d3. 45.74N. 61.32W. September 10 1997. DA • River Denys. gypsum quarry. 34d2. 45.89N. 61.23W. September 23 1997. DB • Seal Cove. 34e1. 45.86N. 61.1W. August 21 1998. DA; **RICHMOND CO.** • Point Michaud. 39d4. 45.58N. 60.7W. August 23 1998. DA; **VICTORIA CO.** • Baddeck. 38c4. 46.1N. 60.77W. July 1 1936. July 18 1936. July 19 1936. July 21 1936. JM. July 27 1936. JM. TF • Brian Point. 38b4. 46.06N. 60.88W. August 17 1998. DB • Hunter Creek. Baddeck. 38c4. 46.1N. 60.77W. July 20 1936. TF • MacDonalds Pond. Cabot Trail. 37e5. 46.39N. 60.51W. August 3 1997. PB.

Enallagma c. cyathigerum (Charpentier 1840)

Northern Bluet
agrion porte-coupes
First: CBI (Walker 1953, as *E. cyathigerum*), LL (1936, J.H. McDunnough, CNCI), HL (1983, R.A. Layberry, CNCI).
Global: G5 *Canada:* N5
Nova Scotia: Indetermined

Found in peatland ponds and lakes, the nominate subspecies is comparatively common throughout the region, and can be distinguished from *E. c. vernale* only under the microscope. It is likely that confusion has happened frequently between the two subspecies.

CAPE BRETON CO. • 'North Forchu Bog'. Gabrus Lake to North Forchu road. north of North Forchu. 44b3. 46.25N. 59.27W. July 17 1998. PB; **INVERNESS CO.** • 0.7km (0.4mi) east of the MacKenzie Mountain Fire Tower. CBHNP. 37b2. 46.75N. 60.83W. July 5 1983. RL • Benjies Lake. Mackenzie Mountain. CBHNP. 37b2. 46.74N. 60.81W. June 23 1983. RL • Big Brook. Georgia Pacific Mine. gypsum sinkhole. 34d2. 45.81N. 61.23W. June 3 1998. DA • bog. 1.1km (0.7mi) southwest of radio tower. North Mountain. CBHNP. 37c1. 46.82N. 60.67W. July 8 1983. RL • French Lake Bog. French Mountain. CBH. 37b2. 46.73N. 60.85W. June 27 1983. July 5 1983. RL • Jim Cambells Barren. 37b4. 46.57N. 60.92W. July 9 1997. RL; **VICTORIA CO.** • 3.2km (2mi) northeast of Baddeck Bridge. 38c3. 46.15N. 60.79W. July 11 1996. OF • Baddeck. 38c4. 46.1N. 60.77W. July 9 1936. JM • bog. southwest end Wreck Cove Dam 2. Ingonish 1 Reservoir. east of eastern canal road. 37d3. 46.62N. 60.63W. July 5 1997. PB • 'Everlasting Barren Bog'. northeast of Cheticamp Flowage dam. 37c2. 46.67N. 60.65W. August 2 1997. July 15 1998. PB • MacDougalls Lake. CBHNP. 37e2. 46.67N. 60.44W. July 2 1983. RL • Paquets Lake. CBHNP. 37e1. 46.83N. 60.43W. August 14 1983. JEM. RM • Mary Ann Falls Road. CBHNP. 42a1. 46.77N. 60.37W. July 6 1984. H.J. Teskey. CNCI; **St. Paul Island,** Cabot Strait north of Cape Breton Island. 41b1. 47.18N. 60.15W. July 25 1955. DF.

Enallagma c. vernale (Gloyd 1943)

Springtime Bluet
agrion printanier
First: CBI (Brunelle 1997a as *E. vernale*), LL and HL (1955, D.C. Ferguson, NSM).
Global: G4
Nova Scotia: Indetermined

Little is known of this species in the region, and the one record from North Mountain is insufficiently detailed to draw conclusions regarding habitat. The taxonomic status of *E. c. vernale* is currently being reconsidered by various researchers, and there has been confusion between the subspecies in the past.

VICTORIA CO. • North Mountain. 36d5. 46.88N. 60.58W. August 2 1953. DF; **St. Paul Island,** Cabot Strait north of Cape Breton Island. 41b1. 47.18N. 60.15W. July 20 1955. July 25 1955. DF.

Enallagma ebrium (Hagen 1861)

Marsh Bluet
agrion enivré
First: CBI (Brunelle 1997a), LL (1936, T.N. Freeman, CNCI), HL (1983, R.A. Layberry, CNCI).
Global: G5
Canada: N5
Nova Scotia: Green Status

The marsh bluet is a very common, small, bright blue species found throughout the region in most slow water habitats with emergent plants.

CAPE BRETON CO. • University College of Cape Breton campus. Sydney. 43b3. 46.13N. 60.17W. July 4 1985. ST; **INVERNESS CO.** • Ashfield. 34e1. 45.89N. 61.16W. August 7 1998. DA • Ashfield Road. beaver pond. 34e1. 45.89N. 61.23W. August 11 1997. DB • Benjies Lake. Mackenzie Mountain. CBHNP. 37b2. 46.74N. 60.81W. June 23 1983. RL. August 10 1984. JEM. RM • Doyole (Doyle?) Road. Margaree. 33e1. 46.32N. 61.09W. August 24 1997. DB • McCormick Corner. 33d3. 46.16N. 61.28W. July 19 1998. DA • Rough Brook Road. 33d3. 45.73N. 61.33W. July 24 1998. DB; **VICTORIA CO.** • 0.3km (0.2mi) west of Round Lake. CBHNP. 37d1. 46.81N. 60.51W. July 10 1983. RL • Big Barren. 38b2. 46.27N. 60.85W. September 1 1998. DA • Paquets Lake. CBHNP. 37e1. 46.83N. 60.43W. June 30 1983. RL. August 14 1983. JM. RM. August 15 1996. PB • Baddeck. 38c4. 46.1N. 60.77W. June 30 1936. TF. July 1 1936. JM. July 7 1936. TF. July 8 1936. JM. July 10 1936. TF. July 11 1936. July 18 1936. JM. July 21 1936. TF. July 27 1936. JM. July 6 1954. R.D. Gray. NSM. June 14 1998. DA • Jigging Cove Lake. CBHNP. 42a1. 46.79N. 60.33W. June 28 1983. RL • Mary Ann Falls Road. CBHNP. 42a1. 46.77N. 60.37W. July 6 1984. H.J. Teskey. CNCI • Paquets Lake. CBHNP. 37e1. 46.83N. 60.43W. August 14 1983. JEM. RM • Washabuct River. 38b4. 46.05N. 60.86W. July 20 1998. DB.

Enallagma hageni (Walsh 1863)

Hagen's Bluet
agrion de Hagen
First: CBI and LL (Walker 1933), HL (1983, R.A. Layberry, CNCI).
Global: G5
Canada: N5
Nova Scotia: Green Status

This is another very common species of virtually all slow waters; the one record from the Highlands is not detailed and may be low on the Plateau escarpment.

CAPE BRETON CO. • Cricket Lake, north of North Forchu. 44b3. 46.25N. 59.27W. July 17 1998. PB • Sydney. 43b3. 46.14N. 60.17W. July 24 1914. EW. Walker 1933. ROM; **INVERNESS CO.** • Ashfield. 34e1. 45.84N. 61.23W. August 12 1997. DB • Loch Ban. Lake Ainslie. 33d3. 46.17N. 61.27W. June 29 1998. DB; **VICTORIA CO.** • 4km (2.5mi) east of South Harbour. CBHNP. 36e5. 46.85N. 60.44W. July 11 1983. RL • Baddeck. 38c4. 46.1N. 60.77W. July 9 1936. JM. July 10 1936. TF. July 11 1936. July 20 1936. July 13 1938. JM. July 3 1947. DF. Cook 1950. July 5 1954. DF. July 6 1954. R.D. Gray. NSM • Brian Point. 38b4. 46.06N. 60.88W. DB • Dingwall. Aspy Bay. 36e5. 46.89N. 60.57W. July 27 1917. A.G. Huntsman. Walker 1933 • freshwater marsh. 0.1km (0.06mi) north of Freshwater Lake. CBHNP. 37e3. 46.64N. 60.42W. July 6 1983. RL • MacDonalds Pond. Cabot Trail. 37e5. 46.39N. 60.51W. August 3 1997. PB • Plaister Mines. 38c3. 46.14N. 60.67W. July 29 1998. DA • Warren Lake. CBHNP. 37e2. 46.72N. 60.39W. July 17 1943. MS. August 15 1996. PB • Washabuck. 38c4. 46.07N. 60.84W. July 1 1947. DF. Cook 1950.

Genus ***ISCHNURA*** – Forktails

The forktails, named for a prominence on the top of the tenth segment of the abdomen, are diverse in species in Maine and to the south, but only two species are found in the Maritimes, and both are on CBI.

Ischnura posita (Hagen 1861)

Fragile Forktail
agrion posé
First: CBI and Lowlands (1997, D. Banks, DNRB), HL (1999, D. Anderson, DNRB).
Global: G5
Nova Scotia: Green Status

The fragile forktail is a tiny species of cattail ponds and the slow marginal waters of streams and rivers. It can easily be overlooked due to its size, cryptic colouration, and flight near to the water surface among emergent plant stems. The green exclamation mark on the shoulders and the absence of a blue tip to the abdomen discriminates it from the more common *I. verticalis*.

INVERNESS CO. • Ashfield Road. beaver pond. 34e1. 45.89N. 61.23W. August 11 1997. DB • Brian Point. 38b4. 46.06N. 60.88W. August 17 1998. DB • Mary's Pond. Brian Point. 38b4. 46.06N. 60.88W. August 21 1998. DB; **VICTORIA CO.** • Highland Road. 22km (13.7mi) from Hunters Mountain gate. 38b2. 46.29N. 60.82W. DA.

Ischnura verticalis (Say 1839)

Eastern Forktail
agrion vertical
First: CBI and LL (Walker 1933), HL (1983, R.A. Layberry, CNCI).
Global: G5
Canada: N5
Nova Scotia: Green Status

This is a species of all types of slow waters in the region, including the margins of running waters, though not found in the barrens ponds of the Highlands. The eastern forktail is the most common damselfly in the region and arguably the most attractive. The male has apple green iridescent markings on the thorax and a blue tip to the abdomen, the female is bluish gray with an apple green underside. Teneral specimens are brilliant orange and should not be mistaken for *Amphiagrion saucium*.

CAPE BRETON CO. • 3.2km (2mi) southwest of Marion Bridge, 43b5, 45.98N, 60.2W, July 2 1991, University of New Hampshire, Durham • Enon, 39e2, 45.81N, 60.53W, June 20 1994, D.P. Wiseman, UCCB • Glace Bay, 43d3, 46.2N, 59.95W, September 12 1994, C.G. Pyke, UCCB • New Waterford, 43c2, 45.25N, 60.06W, September 21 1994, RSM • Scatarie Island, 45a4, 46.0N, 59.75W, July 1 1917, A.G. Huntsman, Walker 1933, July 28 1963, BW • Sydney, 43b3, 46.14N, 60.17W, July 24 1914, EW, Walker 1933; **INVERNESS CO.** • Benjies Lake, Mackenzie Mountain, CBHNP, 37b2, 46.74N, 60.81W, August 10 1984, JEM, RM • Big Brook, 34d2, 45.81N, 61.23W, June 8 1998, DA • Big Brook, Georgia Pacific Mine, gypsum sinkhole, 34d2, 45.81N, 61.23W, June 3 1998, DA • Highland Road, beaver pond, 23.6km (14.7mi) north of the Hunters Mountain Gate, 38b1, 46.48N, 60.82W, August 1 1997, PB • Jim Cambells Barren, 37b4, 46.57N, 60.92W, July 9 1997, RL • Cheticamp River, 37a3, 46.65N, 60.97W, August 4 1917, A.G. Huntsman, Walker 1933 • Doyle Road, Margaree, 33e1, 45.32N, 61.08W, August 26 1997, June 10 1998, DA • Fiset Brook (as 'Plateau River'), Cheticamp, 37a3, 46.6N, 61.02W, August 4 1917, A.G. Huntsman, Walker 1933 • Fishing Cove Lake, CBHNP, 37b2, 46.71N, 60.84W, August 18 1984, JEM • Loch Ban, Lake Ainslie, 33d3, 46.17N, 61.27W, June 29 1998, DB • Petite Etang Beach, 37a3, 46.67N, 60.97W, July 12 1983, RL • River Inhabitants, 34d2, 45.78N, 61.32W, July 13 1998, DA • sphagnum bog, Highway 105, 14km (8.7mi) north of Canso Causeway bridge, 34c3, 45.77N, 61.33W, August 1 1997, September 6 1997, PB; **VICTORIA CO.**; 3.2km (2mi) northeast of Baddeck Bridge, 38c3, 46.15N, 60.79W, July 11 1996, OF • 4km (2.5mi) east of South Harbour, CBHNP, 36e5, 46.85N, 60.44W, July 11 1983, RL • Bay St. Lawrence, 36e4, 47.0N, 60.47W, July 26 1917, A.G. Huntsman, Walker 1933 • Big Harbour trout pond, 38d3, 46.15N, 60.63W, August 30 1998, DB • Cabot Trail at Neils Harbour, CBHNP, 42a1, 46.82N, 60.35W, July 29 1917, A.G. Huntsman, Walker 1933 • 'Cheticamp Flowage Dam overflow fen', north end of dam, 37c3, 46.66N, 60.67W, August 28 1997, PB • Dingwall, Aspy Bay, 36e5, 46.89N, 60.57W, July 27 1917, A.G. Huntsman, Walker 1933 • Forks Baddeck, near, 38c4, 46.18N, 60.78W, June 20 1936, June 23 1936, June 30 1936, July 1 1936, July 8 1936, JM, July 9 1936, TF, July 18 1936, July 23 1936, JM, July 27 1936, TF • freshwater marsh, 0.1km (0.06mi) north of Freshwater Lake, CBHNP, 37e3, 46.64N, 60.42W, July 6 1983, RL • Jigging Cove Lake, CBHNP, 42a1, 46.79N, 60.33W, August 15 1984, JEM • MacDonalds Pond, Cabot Trail, 37e5, 46.39N, 60.51W, August 3 1997, PB • Paquets Lake, CBHNP, 37e1, 46.83N, 60.43W, June 30 1983, RL, August 14 1983, JEM, RM • South Harbour, 36e5, 46.87N, 60.47W, June 27 1983, RL, July 11 1984, H.J. Teskey, CNCI • Warren Lake, CBHNP, 37e2, 46.72N, 60.39W, July 17 1953, MS, August 15 1996, PB • Washabuck, 38c4, 46.07N, 60.84W, July 1 1947, DF, Cook 1950.

Genus ***NEHALENNIA*** – Sprites

The sprites are inhabitants of acidic bogs, fens and ponds. Both species known in the region are found on CBI, and both their genders are iridescent green. They are the smallest odonates in the Maritimes and are easily overlooked when collecting.

Nehalennia gracilis Morse 1895

Sphagnum Sprite
déesse gracieuse
First: CBI (Walker 1953 as 'Cape Breton Is.').
Global: G5
Nova Scotia: Indetermined

This tiny species appears to be an obligate inhabitant of acidic waters, particularly acidic fens. No details have been found to substantiate the record in Walker (1953) of this species' presence on CBI, however the reference is credible.

Nehalennia irene (Hagen 1861)

Sedge Sprite
déesse paisible
First: CBI (Walker 1953), LL (1966, B. Wright, NSM), HL (1983, R.A. Layberry, CNCI).
Global: G5
Canada: N5
Nova Scotia: Green Status

A delicate species of peatland ponds, fens and cattail ponds, common throughout the region. Males are discriminated from *N. gracilis* by the dorsum of the tenth segment being partially black, females by the collar of the pronotum ('neck') being trilobed rather than bilobed.

INVERNESS CO. • Ashfield, 34e1, 45.89N, 61.16W, June 22 1998, DA • Fishing Cove River, MacKenzie Mountain, CBHNP, 37b2, 46.75N, 60.83W, June 4 1983, RL • sphagnum bog, Highway 105, 14km (8.7mi) north of Canso Causeway bridge, 34c3, 45.77N, 61.33W, July 14 1998, PB • Whycocomagh, 33e5, 45.97N, 61.13W, June 24 1966, BW; **VICTORIA CO.** • 3.2km (2mi) northeast of Baddeck Bridge, 38c3, 46.15N, 60.79W, July 11 1996, OF • North Bay, Ingonish, 37e2, 46.67N, 60.42W, July 7 1984, RL • Paquets Lake, CBHNP, 37e1, 46.83N, 60.43W, June 30 1983, RL.

SUBORDER **ANISOPTERA** – Dragonflies

The dragonflies are larger and heavier of thorax and abdomen than the damselflies. Adults have hindwings broader than their forewings, and when perched the wings are held more or less horizontally. Larvae are also heavy-bodied and do not have the three caudal lamellae of the damselflies.

FAMILY AESHNIDAE – Darners

Genus *AESHNA* – Darners

The largest and widest distributed genus of its family in North America, species being found from the extreme south to high in the subarctic zone. Most species have markings similar to those of *Aeshna subarctica* (Figure 16); and although the form of the thoracic bars is somewhat specific and useful in field determination, morphological details should be used to confirm. Males are generally dark in colour with blue and bright green markings, females generally browner, the markings in green and yellow though occasionally androchromatic (in colour like the males).

Aeshna canadensis Walker 1908

Canada Darner
aeschne du Canada
First: CBI and LL (Walker 1933), HL (1983, J.E.H. Martin, CNCI).
Global: G5
Nova Scotia: Green Status

The Canada darner is a common, bright-coloured species of lakes, streams, and peatland ponds. It is very similar in appearance to the larger *A. eremita*, and females are often androchromatic.

CAPE BRETON CO. • Campbelldale Road, 44b1, 45.89N, 60.27W, August 3 1998, DA • University College of Cape Breton campus, Sydney, 43b3, 46.13N, 60.17W, July 25 1985, ST, September 22 1993, J.E.S. Laveck, UCCB; **INVERNESS CO.** • Ashfield, 34e1, 45.89N, 61.16W, August 5 1998, DA • Ashfield Road, beaver pond, 38d3, 45.89N, 61.16W, September 18 1997, DB • Doyle Road, Margaree, 33e1, 46.32N, 61.09W, August 24 1997, DB • Keppoch Highlands, 38a4, 46.07N, 61.04W, August 5 1998, DA • McCormick Corner, 33d3, 46.16N, 61.28W, July 19 1998, DA • Port Hastings, 34c4, 45.64N, 61.39W, September 10 1997, DA • sphagnum bog, Highway 105, 14km (8.7mi) north of Canso Causeway bridge, 34c3, 45.77N, 61.33W, August 27 1997, PB, September 9 1997, PB; **RICHMOND CO.** • bog, Highway 104, Cannes, 39a4, 45.64N, 60.98W, August 2 1998, August 23 1998, DA • Point Michaud, 39d4, 45.58N, 60.7W, August 23 1998, DA; **VICTORIA CO.** • Baddeck, 38c4, 46.11N, 60.77W, July 20 1998, DA • Baddeck Bridge, 38c4, 46.12N, 60.8W, September 1 1998, DA • Big Baddeck, 38b2, 46.13N, 60.8W, September 2 1998, DB • Big Harbour, 38d3, 46.15N, 60.63W, September 9 1997, DB • Big Harbour Ducks Unlimited impoundment, 38d3, 46.15N, 60.63W, August 27 1998, DB • Big Harbour Ducks Unlimited pond, 38d3, 46.15N, 60.63W, August 11 1997, DB • Big Harbour trout pond, 38d3, 46.15N, 60.63W, August 6 1997, DB • bog, east of Park Spur, 37c4, 46.52N, 60.7W, July 23 1998, DB • 'Cheticamp Flowage Dam overflow fen', north end of dam, 37c3, 46.66N, 60.67W, August 28 1997, PB • Cow Bay, 38b4, 46.07N, 60.89W, September 20 1997, DB • Dingwall, Aspy Bay, 36e5, 46.89N, 60.57W, July 27 1917, A.G. Huntsman, Walker 1933, ROM • 'Everlasting Barren Bog', northeast of Cheticamp Flowage dam, 37c2, 46.67N, 60.65W, September 30 1997, PB • Glen Tosh, 38c3, 46.18N, 60.63W, September 23 1997, DB • Green Point, 38a5, 46.02N, 60.97W, July 25 1998, DB • Highland Road, Mile 3 (4.8km), 38b3, 46.16N, 60.86W, August 1 1998, DA • MacDonalds Pond, Cabot Trail, 37e5, 46.39N, 60.51W, August 3 1997, PB • Paquets Lake, CBHNP, 37e1, 46.83N, 60.43W, August 15 1996, PB, August 14 1983, JEM, RM • Plaister Mines, 38c3, 46.14W, 60.67N, July 29 1998, DA • Port Bevis, 38b4, 46.14N, 60.65W, September 9 1997, DB • Ronnies Lake Road, 37c4, 46.48N, 60.67W, July 23 1998, DB • Washabuct River, 38b4, 46.05N, 60.86W, September 14 1997, DB • Wreck Cove Road near the Nova Scotia Power powerhouse, 37e4, 46.53N, 60.43W, August 2 1997, PB.

Aeshna eremita Scudder 1866

Lake Darner
aeschne porte-crosses
First: CBI, LL and HL (Walker 1933).
Global: G5
Canada: N5
Nova Scotia: Green Status

This species was common in all waters sampled in the Highlands, except for the flark ponds of the barrens, and is often found at lakes and running waters throughout the region. This is the largest species of its genus, heavier than *A. tuberculifera* though shorter than the largest specimens of that species. Females taken at Cranberry Lake in the Highlands were androchromatic, and blended well with the blue reflections on the lake water. Those taken at the nearby bog ponds were heterochromatic and virtually invisible against the peat margins in which they were ovipositing.

CAPE BRETON CO. • Scatarie Island, 45a4, 46.0, 59.75, July 28 1963, BW; **INVERNESS CO.** • 0.7km (0.4mi) east of the MacKenzie Mountain Fire Tower, CBHNP, 37b2, 46.75N, 60.83W, July 5 1983, RL • beaver pond, Ashfield Road, 34d3, 45.98N, 61.16W, September 18 1997, DB • bog, Cabot Trail, at 'Bog Trail' head of trail, CBHNP, 37b2, 46.74N, 60.83W, August 29 1997, PB • bog, southwest end Wreck Cove Dam 2, Ingonish 1 Reservoir, east of eastern canal road, 37d3, 46.62N, 60.63W, July 5 1997, PB • Caribou Barrens, CBHNP, 37c2, 46.72N, 60.67W, July 26 1996, RL • Cranberry Barren, northwest of Cheticamp Flowage Dam, CBHNP, 37c2, 46.67N, 60.7W, August 20 1997, PB • Cranberry Lake, north west of Cheticamp Flowage dam, CBHNP, 37c2, 46.67N, 60.7W, August 20 1997, PB • Eden, 34e2, 45.85N, 61.12W, August 12 1997, DB • Fishing Cove Lake, CBHNP, 37b2, 46.71N, 60.84W, August 18 1984, RM • French Lake Bog, French Mountain, CBHNP, 37b2, 46.73N, 60.85W, July 5 1983, RL • French Lake, CBHNP, 37b2, 46.73N, 60.85W, August 10 1976, 'D.S.D. and A.W.', NSM, August 16 1984, August 18 1984, RM • French Mountain, CBHNP, 37b2, 46.73N, 60.85W, July 1 1954, R.D. Gray, NSM • MacLean Point, Denys Basin, 39a1, 45.9N, 61.03W, August 2 1998, DB • Pembroke Lake, inland from Grand Étang, 37a4, 46.54N, 62.04W, September 2 1919, A.G. Huntsman, Walker 1933, ROM • 'Radio Tower Bog 2', North Mountain, 0.5km (0.3mi) south of the Cabot Trail, CBHNP, 37c1, 46.8N, 60.67W, July 16 1998, PB; **RICHMOND CO.** • Garrets Lake, 39c4, 45.64N, 60.78W, August 23 1998, DA; **VICTORIA CO.** • Baddeck, 38c4, 46.11N, 60.77W, July 8 1998, July 20 1998, DA • Big Harbour, 38d3, 46.15N, 60.63W, September 9 1997, DA • Big Harbour Ducks Unlimited marsh, 38d3, 46.15N, 60.63W, August 11 1997, DB • Big Harbour Ducks Unlimited pond, 34d3, 46.15N, 60.63W, October 1 1997, DB • Cow Bay, 38b4, 46.07N, 60.89W, September 1 1997, DB • Dingwall, Aspy Bay, 36e5, 46.89N, 60.57W, July 27 1917, A.G. Huntsman, Walker 1933 • Skinny-dip Pond, 38d3, 46.16N, 60.63W, September 16 1997, DB • bog, southwest end Wreck Cove Dam 2, Ingonish 1 Reservoir, east of eastern canal road, 37d3, 46.62N, 60.63W, August 1 1997, PB • 'Everlasting Barren Bog', northeast of Cheticamp Flowage dam, 37c2, 46.67N, 60.65W, August 2 1997, August 28 1997, September 6 1997, July 15 1998, PB • Highland Road, Mile 1 (1.6km), 38b3, 46.14N, 60.88W, August 1 1998, DA • Highland Road, Mile 5 (8km), 38b3, 46.17N, 60.84W, August 8 1998, DA • Paquets Lake, CBHNP, 37e1, 46.83N, 60.43W, August 13 1983, August 14 1983, JEM, RM • Ronnies Lake Road, 37c4, 46.48N, 60.67W, July 23 1998, DB; **St. Paul Island,** Cabot Strait north of Cape Breton Island, 41b1, 47.18N, 60.15W, July 21 1955, July 22 1955, July 25 1955, DF.

Aeshna interrupta interrupta Walker 1908

Variable Darner
aeschne domino
First: CBI and LL (Walker 1933), HL (1997, P.M. Brunelle).
Global: G5
Canada: N5
Nova Scotia: Green Status

This robust species is common throughout the region in lakes, marshes, and particularly cattail ponds. The variable darner is distinct in that the thoracic bars are interrupted to form four ovate spots, although occasionally females are found in the region which have the spots narrowly connected, and the top front dot is sometimes greatly reduced in males. Rarely found at sphagnum or peat ponds, the species was encountered in the Highlands laying in the cattail fen at the north end of Cheticamp Flowage dam, but not at the barrens ponds nearby.

CAPE BRETON CO. • Lingan, 43c2, 45.23N, 60.03W, September 14 1991, B.F. Ardelli, UCCB • Sydney, 43b3, 46.13N, 60.17W, MacNeil S.L., UCCB • University College of Cape Breton campus, Sydney, 43b3, 46.13N, 60.17W, August 8 1985, ST • Westmount, 43b3, 46.13N, 60.21W, July 22 1994, B. Kavanaugh, UCCB; **INVERNESS CO.** • Alba Road at Morrison Cove, 39a1, 45.92N, 61.04W, August 13 1997, DB • Ashfield Road, beaver pond, 34e1, 45.9N, 61.17W, September 18 1997, DB • Big Brook, 34d2, 45.81N, 61.23W, September 11 1997, DA • Cheticamp, 37a3, 46.64N, 61.02W, J.M. Francis, UCCB • Grammo Point, 39a1, 45.89N, 60.76W, September 9 1998, DB • Keppoch Highlands, 38a4, 46.07N, 61.04W, August 5 1998, DA • Lewis Mountain, 38a4, 46.05N, 61.04W, September 12 1997, DA • MacIntyre Mountain, 34c3, 45.77N, 61.35W, September 15 1998, DA • MacLean Brook Road, 34e1, 45.89N, 61.16W, August 7 1998, DA • MacLean Point, North Basin, 39a1, 45.9N, 61.03W, DB • Port Hastings, 34c4, 45.63N, 61.38W, September 10 1997, DA • Seal Cove, 34e1, 45.86N, 61.1W, August 21 1998, DA • Whycocomagh, 33e5, 45.97N, 61.13W, July 28 1989, E. Georgeson, DNRI; **RICHMOND CO.** • bog, Highway 104, Cannes, 39a4, 45.64N, 60.98W, August 2 1998, DA; **VICTORIA CO.** • Baddeck, 38c4, 46.1N, 60.77W, July 19 1996, E. Georgeson, DNRI • Baddeck, near, 38c4, 46.1N, 60.77W, August 14 1948, EW, ROM • Big Barren, 38b2, 46.27N, 60.85W, August 1 1998, DA • Birch Point, 38b4, 46.06N, 60.86W, September 7 1998, DB • Cabot Trail, low on north side of Cape Smokey, CBHNP, 42a1, 46.62N, 60.38, August 15 1996, PB • 'Cheticamp Flowage Dam overflow fen', north end of dam, 37c3, 46.66N, 60.67W, August 28 1997, PB • Cow Bay, 38b4, 45.89N, 61.16W, September 28 1997, DB • Dingwall, Aspy Bay, 36e5, 46.89N, 60.57W, July 27 1917, A.G. Huntsman, Walker 1933 • Highland Road, Mile 1 (1.6km), 38b3, 46.14N, 60.88W, July 30 1998, DA • Highland Road, Mile 3 (4.8km), 38b3, 46.16N, 60.86W, August 8 1998, DA • Highland Road, Mile 6 (9.7km), 38b3, 46.19N, 60.84W, August 1 1998, DA • Highland Road, 6.7km (4.2mi) from Hunters Mountain gate, 38b3, 46.14N, 60.75W, July 23 1998, DB • Mary's Pond, Brian Point, 38b4, 46.06N, 60.88W, August 17 1997, DB • Paquets Lake, CBHNP, 37e1, 46.83N, 60.43W, August 29 1997, PB • Red Point West, 39a1, 45.92N, 60.95W, August 2 1998, DB • Skinny-dip Pond, 38d3, 46.16N, 60.63W, September 16 1997, DB • Wreck Cove Road near Gisborne Flowage, 37d4, 46.55N, 60.57W, August 4 1997, PB.

Aeshna sitchensis Hagen 1861

Zigzag Darner
aeschne à zigzags
First: CBI and HL (1983, R.A. Layberry, CNCI), LL (1985, S. Tynski, UCCB).
Global: G5
Canada: N5
Nova Scotia: Yellow Status

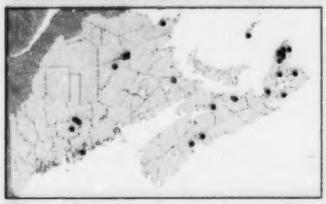
This is a small northern species of acidic fens and flark ponds, infrequently encountered in the Maritimes and even more rarely found in abundance. The zigzag darner has sharply angled thin lateral thoracic bars and seems to be more numerous on CBI than elsewhere in the Maritimes although it is being discovered in more sites in New Brunswick as peat bogs and acidic fens are investigated. Observations of this species at Everlasting Barren in the Highlands suggest that laying is usually in the peat surrounding the smaller, shallow flark ponds (ca. k7, Figure 6, also Figure 8), and sometimes at a distance from them on the bog matt. Larval collection did not yield any of this species in the ponds and it may be that the larvae live in the water-saturated sphagnum rather than in open water. The two Lowlands records suggest that the species is no more abundant there than in mainland Nova Scotia. The zigzag darner is unusual among our aeshnids in perching on the ground or on standing deadwood.

CAPE BRETON CO. • University College of Cape Breton campus, Sydney, 43b3, 46.13N, 60.17W, July 24 1985, ST; **INVERNESS CO.** • bog, 1.1km (0.7mi) southwest of radio tower, North Mountain, CBHNP, 37c1, 46.82N, 60.67W, June 30 1983, July 8 1983, RL • Fishing Cove Lake, CBHNP, 37b2, 46.71N, 60.84W, August 18 1984, JEM • MacKenzie Mountain, 3.2km (2mi) east of Benjies Lake, CBHNP, 37b2, 46.74N, 60.76W, July 14 1983, RL • North Mountain, CBHNP, 37c1, 46.82N, 60.67W, August 15 1983, August 10 1984, JEM, RM • 'Radio Tower Bog 1', North Mountain, adjacent to the Cabot Trail, CBHNP, 37c1, 46.8N, 60.67W, July 16 1998, PB • sphagnum bog, Highway 105, 14km (8.7mi) north of Canso Causeway bridge, 34c3, 45.77N, 61.33W, August 27 1997, PB • 'Trap Bog', probably North Mountain, CBHNP, 37c1, 46.81N, 60.68W, July 6 1983, July 8 1983, coll. 'Wood', CNCI; **VICTORIA CO.** • 1.6km (1mi) southwest of Paquets Lake, CBHNP, 37e1, 46.82N, 60.45W, July 10 1983, RL • Big Barren, 38b2, 46.27N, 60.85W, August 1 1998, DA • 'Everlasting Barren Bog', northeast of Cheticamp Flowage dam, 37c2, 46.67N, 60.65W, August 28 1997, July 15 1998, PB • Wreck Cove Road, 37d4, 46.55N, 60.62W, July 25 1998, DA.

Figure 15: ***Aeshna sitchensis***

Male. The thin angular thoracic markings ar· also shared by the more northern species *A. septentrionalis*, which can be disriminated from *A. sitchensis* by the greater blue on the abdomen, and the form of the mushroom-shaped marking on the top of the frons ('nose'). see Walker (1958, page 120).

Aeshna subarctica Walker 1908



Subarctic Darner
aeschne subarctique
First: CBI and HL
(1983, J.E.H. Martin, CNCI),
LL (1984, R.J. Martin, CNCI).
Global: G5
Canada: N5
Nova Scotia: Green Status

The subarctic darner is another northern species which appears to have its greatest population in the Maritimes on CBI, although also being found throughout in peat bogs and acidic fens. *A. subarctica* is similar to *A. canadensis* in appearance and determination of both genders must be confirmed morphologically by the keys. The species appears to be an obligate inhabitant of open-water ponds in those peatlands which have such features, and was found at all such habitats visited in the Lowlands and Highlands, and particularly at a small sphagnum bog 14km (8.7mi) from the Canso Causeway bridge on Highway 105. Elsewhere in the region it has been found in acidic fens, often where there is little or no open water.

CAPE BRETON CO. • University College of Cape Breton campus, Sydney, 43b3, 46.13N, 60.17W, September 21 1994, RSM; **INVERNESS CO.** • Benjies Lake, Mackenzie Mountain, CBHNP, 37b2, 46.74N, 60.81W, August 10 1984, JEM, RM • bog, Cabot Trail, at 'Bog Trail' head of trail, CBHNP, 37b2, 46.74N, 60.83W, August 29 1997, PB • French Lake, CBHNP, 37b2, 46.73N, 60.85W, August 18 1984, RM • Jim Campbells Barren, 37b4, 46.56N, 60.89W, August 8 1998, DA • North Mountain, CBHNP, 37c1, 46.82N, 60.67W, August 15 1983, JEM, RM • Queensville, 34c3, 45.75N, 61.35W, August 7 1998, DA • sphagnum bog, Highway 105, 14km (8.7mi) north of Canso Causeway bridge, 34c3, 45.77N, 61.33W, August 27 1997, September 6 1997, PB; **RICHMOND CO.** • L'Ardoise West, 39c4, 45.62N, 60.77W, August 23 1998, DA; **VICTORIA CO.** • 'Everlasting Barren Bog', northeast of Cheticamp Flowage dam, 37c2, 46.67N, 60.65W, September 6 1997, PB • Highland Road, Mile 1 (1.6km), 38b3, 46.14N, 60.88W, August 8 1998, DA • Jigging Cove Lake, CBHNP, 42a1, 46.79N, 60.33W, August 10 1984, RM • Paquets Lake, CBHNP, 37e1, 46.83N, 60.43W, August 14 1983, JEM, RM • 'small bog', Cheticamp Lake Road, 1km (0.62mi) west of Snowshoe Lake bend, 37c3, 46.63N, 60.65W, August 3 1997, PB.

Figure 16: ***Aeshna subarctica***

Male. The late flight of this species is likely the reason why it has been rarely encountered in the region. It is also, like *A. sitchensis* rarely seen in the abundant evening feeding swarms in which other aeshnids are frequently encountered.

Aeshna tuberculifera Walker 1908

Black-tipped Darner
aeschne à tubercules
First: CBI and HL
(1997, P.M. Brunelle),
LL (1998, D. Anderson, DNRB).
Global: G4
Nova Scotia: Green Status

This large species of cattail ponds is notable in that only androchromatic females are found, and can be discriminated from other species of the genus by the lack of light coloured markings on the top of abdominal segment ten. The collection of one exuviae at a small grassy pond beside Wreck Cove Flowage is most likely indicative of laying by a female wandering from the Lowlands as that site is near the road up from Wreck Cove, a logical flight route.

INVERNESS CO. • Ashfield, 34e1, 45.89N, 61.16W, August 21 1998, DA • Eden, 34e2, 45.85N, 61.15W, August 21 1998, DA • MacIntyre Mountain, 34c3, 45.77N, 61.35W, September 15 1998, DA • Seal Cove, 34e1, 45.86N, 61.1W, September 4 1998, DA; **VICTORIA CO.** • pond beside Wreck Cove Flowage, Wreck Cove Road, 37e4, 46.55N, 60.5W, August 19 1997, exuvia, PB; **RICHMOND CO.** • bog, Highway 104, Cannes, 39a4, 45.64N, 60.98W, August 2 1998, DA.

Aeshna umbrosa umbrosa Walker 1908

Shadow Darner
aeschne des pénombres
First: CBI, LL and HL
(Walker 1933).
Global: G5
Canada: N5
Nova Scotia: Green Status

A species of lakes, running waters, fens, cattail and peatland ponds, the shadow darner is the most common of its genus in the region and on CBI. Although it shows a preference for shaded areas, it is found throughout the day and often in habitats with no shade. It was the most numerous species of the suborder at the Everlasting Barren ponds of the Highlands, where females were taken laying in all types of ponds and males were observed both at the ponds and patrolling the small streams which cross the barren. The species has straight narrow thoracic stripes and little light colouration on the abdomen.

CAPE BRETON CO. • Campbelldale Road, 44b1, 45.89N, 60.27W, August 3 1998, DA • Florence, 43b2, 46.25N, 60.25W, August 26 1994, J.M. Francis, UCCB • Glace Bay, 43d3, 46.2N, 59.95W, August 27 1996, J.N. McGillivary, UCCB • Grand Lake Road, 43c3, 46.15N, 60.12W, August 15 1995, R.J. Luedey, UCCB • Northside East Bay, 38e5, 46.0N, 60.47W, June 20 1991, D. Slade, UCCB • Scatarie Island, 45a4, 46.0N, 59.75W, A.G. Huntsman, Walker 1933 • Sydney, 43b3, 46.13N, 60.17W, September 15 1991, N. MacNeil, UCCB • University College of Cape Breton campus, Sydney, 43b3, 46.13N, 60.17W, September 22 1993, T.N. Kanne , August 15 1994, M. Ratushny, UCCB; **INVERNESS CO.** • Ashfield, 34e1, 45.89N, 61.16W, August 31 1997, DA • Ashfield Road, beaver pond, 34e1, 45.89N, 61.16W, August 21 1997, DA, DB, September 18 1997, DB • Benjies Lake, Mackenzie Mountain, CBHNP, 37b2, 46.74N, 60.81W, August 10 1984, JEM, RM • Big Brook, 34d2, 45.81N, 61.23W, September 11 1997, DA • Cheticamp, 37a3, 46.64N, 61.02W, F. Johansen, CNCI • Doyle Road, Margaree, 33e1, 46.32N, 61.09W, August 24 1997, DB • Everlasting Barren, 37c4, 46.56N, 60.75W, August 8 1998, DA

• 'Fishing Cove River bog', at Cabot Trail, CBHNP, 37b2, 46.74N, 60.83W, August 29 1997, PB • Glenora, 34d3, 45.74N, 61.32W, September 10 1997, DA • Highland Road, beaver pond, 39.2km (24.4mi) north of the Hunters Mountain Gate, 37b5, 46.45N, 60.8W, August 1 1997, PB • Highland Road, Mile 25 (40.1km), 37e5, 46.47N, 60.78W, July 30 1998, DA • Keppoch Highlands, 38a3, 46.13N, 61.05W, August 5 1998, DA • MacIntyre Mountain, 34c3, 45.77N, 61.35W, September 10 1997, DA • Pembroke Lake, inland from Grand Étang, 37a4, 46.54N, 62.04W, September 2 1917, A.G. Huntsman, Walker 1933 • River Denys, gypsum quarry, 38d3, 45.81N, 61.23W, September 18 1997, DA • Seal Cove, 34e1, 45.86N, 61.1W, July 4 1998, DA; **VICTORIA CO.** • Baddeck, 38c4, 46.09N, 60.78W, September 18 1998, DA • Big Barren, 38b2, 46.27N, 60.85W, August 25 1998, DA • Big Harbour, 38d3, 46.15N, 60.63W, August 26 1997, DB • Big Harbour Ducks Unlimited impoundment, 38d3, 46.15N, 60.63W, August 27 1998, DB • Big Harbour Ducks Unlimited marsh, 38d3, 46.15N, 60.63W, August 21 1997, October 13 1997, DB • Big Harbour Road, 38d3, 46.15N, 60.63W, August 31 1998, DB • Big Harbour trout pond, 38d3, 46.15N, 60.63W, September 27 1998, DB • Cabot Trail, low on east side of North Mountain, CBHNP, 37d1, 46.67N, 60.66W, August 15 1996, PB • 'Cheticamp Flowage Dam overflow fen', north end of Cheticamp Flowage Dam, 37c3, 46.66N, 60.67W, August 28 1997, September 6 1997, PB • Cheticamp River, below Cheticamp Flowage Dam, 37c3, 46.65N, 60.64W, August 28 1997, September 6 1997, PB • Clyburn Brook, CBHNP, 37e3, 46.65N, 60.45W, August 15 1996, PB • Cow Bay, 38a4, 46.07N, 60.89W, September 1 1997, DB • East Branch Indian Brook, on Cheticamp Flowage Road, 37d3, 46.58N, 60.63W, August 4 1997, September 30 1997, PB, July 8 1998, DA • 'Everlasting Barren Bog', northeast of Cheticamp Flowage dam, 37c2, 46.67N, 60.65W, August 28 1997, September 6 1997, September 30 1997, PB • Highland Road, Mile 6 (9.6km), 38b3, 46.19N, 60.84W, August 1 1998, August 25 1998, DA • Highland Road, Mile 7 (11.3km), 38b3, 46.21N, 60.83W, August 8 1998, DA • MacNaughton's Brook Road, Keppoch Highlands, 38a4, 46.1N, 61.02W, September 14 1998, DA • Paquets Lake, CBHNP, 37e1, 46.83N, 60.43W, August 14 1983, JEM, RM, August 15 1996, PB • pond near Baddeck River, MacCharles Cross, Big Baddeck, 38b2, 46.13N, 60.8W, September 2 1998, DB • pond on road to Big Hill, 38c3, 46.18N, 60.63W, September 22 1997, DB • Warren Lake, CBHNP, 37e2, 46.72N, 60.39W, August 15 1984, RM • Wreck Cove Flowage, Wreck Cove Road, 37e4, 46.55N, 60.5W, August 2 1997, PB • Wreck Cove Road near the Nova Scotia Power powerhouse, 37e4, 46.53N, 60.43W, August 2 1997, PB.

Genus *ANAX* – Green Darners

Among the largest species of the region are those of this genus, notable in the family in having unmarked green bodies. Only one species is customarily seen in the Maritimes; although *Anax longipes* has been observed once in southern New Brunswick it is thought likely that the individual was a vagrant from the south.

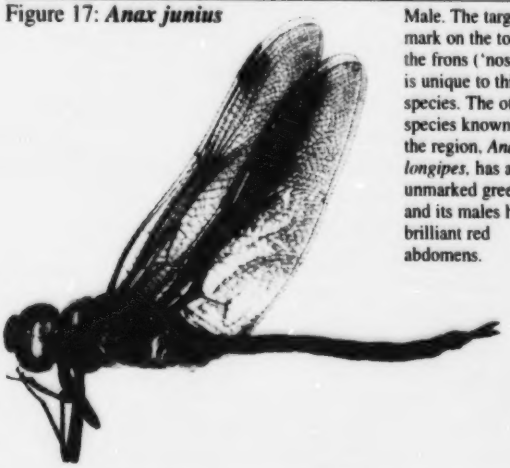
Anax junius (Drury 1770)

Common Green Darner
l'anax
First: CBI (Brunelle 1997a), HL (1980, B. Wright, NSM), LL (1997, P.M. Brunelle).
Global: G5
Canada: N5
Nova Scotia: Green Status

A large and distinctive species of cattail ponds and lakes with emergent vegetation, the common green darner is likely not a year-round resident in the Maritimes as the larvae are not known to over-winter. The species migrates in spring from below New England as far north as CBI and it is possible that there is a complete generation developed during the summer, larvae from eggs laid in May emerging in August, the young adults returning to the south before fall.
The species is close to the largest customarily found in the region, with an emerald green unmarked thorax and extensive sky blue on the abdomen of the male. It has been seen in some numbers at MacDonald's Pond on the east side Cabot Trail and has been taken on the Highlands, though it is not known if it breeds there.

INVERNESS CO. • Big Brook, 34d2, 45.81N, 61.23W, June 26 1998, DA • Gypsum mine, River Denys, 34d2, 45.81N, 61.23W, July 3 1998, DB; **VICTORIA CO.** • Baddeck, 38c4, 46.11N, 60.77W, July 20 1998, DA • Big Barren, 38b2, 46.1N, 60.84W, July 29 1980, BW • MacDonalds Pond, Cabot Trail, 37e5, 46.39N, 60.51W, August 3 1997, PB • Paquets Lake, CBHNP, 37e1, 46.83N, 60.43W, August 14 1983, JEM, RM.

Figure 17: ***Anax junius***



Male. The target mark on the top of the frons ('nose') is unique to this species. The other species known in the region, *Anax longipes*, has an unmarked green frons and its males have brilliant red abdomens.

Genus *BASIAESCHNA* – Springtime Darner

Basiaeschna janata (Say 1839)

Springtime Darner
aeschne printanière
First: CBI and LL (Walker 1958).
Global: G5
Canada: N5
Nova Scotia: Green Status

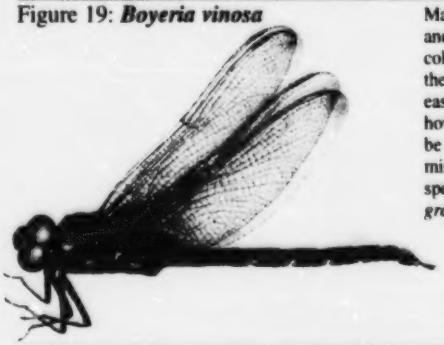
A species commonly found on lakes and running waters, but not in small still waters such as ponds, the springtime darner is one of the earliest members of its family to be seen on the wing in the region, flying rapidly along the shore. It is typically marked for an aeshnid, the dark male having two green and blue bars on the side of the thorax and spots of those colours on the abdomen, the heterochromatic female similarly patterned in greens and yellows.

CAPE BRETON CO. • Mira, 43c4, 46.0N, 60.07W, June 27 1994, T. Nicoll, UCCB; **INVERNESS CO.** • Margaree River near Margaree Harbour, 32e5, 46.42N, 61.08, August 9 1940, EW • Trous Mederick, 1km (0.62mi) east of Grand Étang, 37a4, 46.55N, 61.02W, July 7 1996, OF; **RICHMOND CO.** • Lake Uist, 39d2, 45.8N, 60.57W, June 19 1989, July 3 1989, BW; **VICTORIA CO.** • Baddeck, 38c4, 46.1N, 60.77W, July 6 1954, R.D. Gray, NSM.

Figure 18: ***Basiaeschna janata***

Male. The small size should discriminate this species from the similarly marked *Aeshna juncea*, *A. tuberculifera* and *A. umbrosa*.

Figure 19: ***Boyeria vinosa***



Male. The small size and distinctive colouration makes the fawn darner easy to determine, however care should be taken not to mistake older, darker specimens for *B. grafiana*.

Genus *BOYERIA* – Spotted Darners

The spotted darners are unique in their family in having two yellow spots on the side of the thorax. Note that there is another yellow spot at the auricle (a small protrusion on the side of abdominal segment two of some dragonfly males), but that is not the thorax. Care should be taken not to mistake some species of emeralds (Corduliidae) for spotted darners; those emeralds with similar patterns of dots on the thorax are all very dark in background colour – virtually black – whereas the spotted darners are decidedly brown.

Boyeria vinosa (Say 1839)

Fawn Darner
aeschne vineuse
First: CBI and Lowlands (1993, S.R. Mackie, UCCB).
Global: G5
Canada: N5
Nova Scotia: Green Status

This is a small species of moderate to large size running waters, though it may occasionally be found on lakes. The fawn darner is a light brown colour, with small but distinct dark brown spots at the bases of the wings. These wing spots are absent in *B. grafiana*, quite possibly present on CBI, which is also grayer in colour. Both spotted darners travel close to the shore with a fluttery flight and are a challenge to capture.

CAPE BRETON CO. • East Bay, 43a5N, 46.0W, 60.42, August 7 1993, S.R. Mackie, UCCB; **INVERNESS CO.** • East Skye Glen, 33e4, 46.04N, 61.19W, August 16 1998, J. Bustin, DNRB.

Genus *GOMPHAESCHNA* – Pygmy Darners

Gomphaeschna furcillata (Say 1839)

Harlequin Darner
aeschne pygmée
First: CBI and LL (1999, D. Anderson, DNRB).
Global: G5
Nova Scotia: Yellow Status

This small, brown aeshnid is rare in Canada, and the sole record from CBI is at the northern limit of its regional range. The species is early flying and distinct in its marbled thorax, and in the deeply forked inferior terminal of the male, a character not otherwise seen in the family.

INVERNESS CO. • 'pond', Ashfield Road, 34e1, 45.89N, 61.16W, June 7 1999, DA.

FAMILY GOMPHIDAE – Clubtails

Genus *GOMPHUS* – Clubtails

This is a large genus of predominantly running-water species, many showing laterally expanded abdominal tips in the males, and generally with dull green or yellow markings.

Gomphus adelphus Sélys 1858

Moustached Clubtail
gomphe jumeau
First: CBI and LL (Brunelle 1997a).
Global: G4
Nova Scotia: Green Status

This clubtail is somewhat similar to the ophiogomphids, only less brilliant in colour, and is like them an inhabitant of running waters, particularly trout streams. The moustached clubtail has a transverse black line on the mask (the front of the 'face'), unique among the gomphid species currently known on CBI. Based on distribution elsewhere in the Maritimes the species should be found in the Highland streams.

CAPE BRETON CO. • Sydney River, 43b4, 46.08N, 60.2W, July 5 1990, BW; **INVERNESS CO.** • Trous Mederick, 1km (0.62mi) east of Grand Étang, 37a4, 46.55N, 61.02W, July 7 1996, OF.

Gomphus borealis Needham 1900

Beaverpond Clubtail
gomphe boréal
First: CBI and LL (1998, D. Anderson, DNRB).
Global: G4
Nova Scotia: Indetermined

The beaverpond clubtail is found at still sections of running waters, where the males perch on logs and boulders at the stream edge. A species of muted colouration, males can easily be determined by the arrow-head configuration of the superior terminals when seen from above.

INVERNESS CO. • Ashfield, 34e1, 45.89N, 61.16W, June 11 1998, July 6 1998, DA; **VICTORIA CO.** • Rear Estmere, 39a1, 45.94N, 60.96W, July 10 1998, DA.

Gomphus descriptus Banks 1896

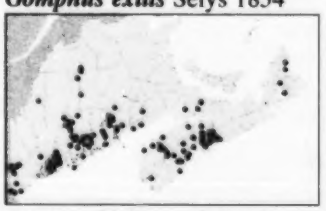
Harpoon Clubtail
gomphe descriptif
First: CBI and LL (1998, D. Anderson, DNRB).
Global: G4
Nova Scotia: Indetermined

The harpoon clubtail is generally found at sandy streams, typically with alder-type marginal brush, and is rare in the Acadian region. In Nova Scotia it had formerly been known only from one larvae taken in Cumberland County, and its discovery in the Lowlands of CBI is significant. Males of this slim species can readily be discriminated from the similar *G. borealis* in that the 'arrowheads' of the superior terminals when seen from above lack a sharp outside barb.

INVERNESS CO. • Big Marsh, 34d1, 45.87N, 61.22W, June 3 1998, DA • River Denys, 34e2, 45.84N, 61.17W, June 3 1998, DA.

Figure 20: ***Gomphus descriptus*** Male.

Gomphus exilis Sélys 1854



Lancet Clubtail
gomphe exilé
First: CBI and LL (Brunelle 1997a), HL (1999, D. Anderson, DNRB).
Global: G5
Canada: N5
Nova Scotia: Green Status

The lancet clubtail is a species of lakes and the slower running waters, the smallest of its genus in the region, dull-coloured, and very common. The CBI records are the furthest north in the Maritimes, but it has been taken considerably higher in Québec.

RICHMOND CO. • Lake Uist, 39d2, 45.8N, 60.57W, July 3 1989, BW; **VICTORIA CO.** • Baddeck, 38c4, 46.1N, 60.77W, July 6 1954, R.D. Gray, NSM • Franey Trail, Ingonish Beach, CBHNP, 37e3, 46.64N, 60.42W, July 11 1996, OF • MacDonalds Pond, Cabot Trail, 37e5, 46.39N, 60.51W, August 3 1997, PB.

Gomphus spicatus Hagen in Sélys 1854

Dusky Clubtail
gomphe pointu
First: CBI and LL (Brunelle 1997a).
Global: G5
Canada: N5
Nova Scotia: Green Status

The dusky clubtail is a species of all still and slow waters; one of the most northern of its genus, it is similar to *G. exilis* but somewhat larger.

INVERNESS CO. • Gypsum mine, River Denys, 34d2, 45.81N, 61.23W, July 3 1998, DB • Lake Ainslie, northeast shore of Loch Ban, 33d3, 46.18N, 61.23W, July 25 1998, G. Peters; **RICHMOND CO.** • Lake Uist, 39d2, 45.8N, 60.57W, June 19 1989, BW.

Genus ***LANTHUS*** – Pygmy Clubtails

These tiny gomphids are apparently obligate inhabitants of small trout streams, particularly those in higher elevations with extensive rapids. The pygmy clubtails are readily discriminated from the otherwise very similar *Stylogomphus albistylus* in that they have black terminalia – whereas *S. albistylus* has very light-coloured terminals, virtually white. The other *Lanthus* known from the region, *L. vernalis*, has not yet been taken in the Maritimes.

Lanthus parvulus (Sélys 1854)

Northern Pygmy Clubtail
gomphe minuscule
First: CBI and LL (Walker 1958), HL (1983, R.A. Layberry, CNCI).
Global: G4
Canada: N4
Nova Scotia: Yellow Status

A brilliantly-coloured little species of running waters with rapids, more strongly marked with black than its congener. The northern pygmy clubtail should prove common in the streams and rivers running off the Highlands. Males perch in brush on the stream banks, usually near rapids or emergent boulders.

INVERNESS CO. • Corney Brook Gorge, 2.3km (1.4mi) southeast of French Lake, CBHNP, 37b2, 46.72N, 60.86W, June 27 1983, June 29 1983, RL; **RICHMOND CO.** • Lake Uist, 39d2, 45.8N, 60.57W, June 19 1989, BW; **VICTORIA CO.** • Baddeck, 38c4, 46.1N, 60.77W, July 2 1936, July 22 1936, July 23 1936, July 26 1936, July 30 1936, JM, TF • Bucklaw, 38a5, 46.02N, 60.98W, Walker 1958.

Figure 21: ***Lanthus parvulus***

Male. *Lanthus vernalis* has much more green on the side of the thorax.

Genus ***OPHIOGOMPHUS*** – Snaketails

This is a genus of medium-sized, dark-bodied species with brilliant green and yellow markings. They inhabit pristine running waters of the 'trout stream' type, although *O. rupinsulensis* is tolerant of mesotrophic waters. Male snaketails are readily determined by the form of the terminals, females less easily by the vulvar lamillae. *Ophgiogomphus colubrinus*, the most northern Gomphid on the continent, is a very likely potential addition to the Highlands list.

Ophiogomphus aspersus Morse 1895

Brook Snaketail
ophiogomphe saupoudré
First: CBI and LL (Walker 1958).
Global: G3G4
Canada: N3
Nova Scotia: Red Status

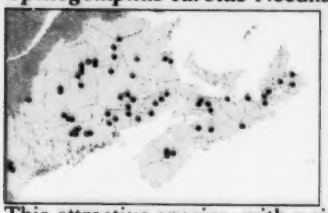
The brook snaketail is found at trout streams and clear-running streams with sandy bottoms. The first CBI record of this species (Walker 1958) was until recently its only record from the province, and it remains a rarity both globally and in the region.

INVERNESS CO. • Mull River, 34c5, 46.0N, 61.37W, July 15 1998, DA • Port Hastings, near, 34c4, 45.63N, 61.42W, Walker 1958.

Figure 22: ***Ophiogomphus aspersus***

Male. This species may in part be rarely encountered because males perch in marginal vegetation, where their brilliant green makes them very unobtrusive, rather than spending most of their time on boulders in, or on the bank of, the stream as do most other species of the genus.

Ophiogomphus carolus Needham 1897

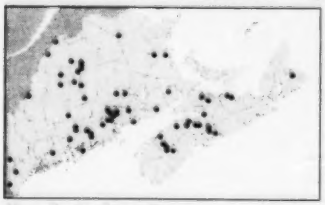


Riffle Snaketail
ophiogomphe de Carole
First: CBI (Brunelle 1997a), LL (1936, J.H. McDunnough, CNCI), HL (1999, D. Anderson, DNRB).
Global: G5
Nova Scotia: Green Status

This attractive species, with a rich green thorax and yellow markings on the abdomen, is abundant in northern New Brunswick. It is usually obvious perching on boulders and on the banks of sandy streams.

CAPE BRETON CO. • North Sydney, 43b2, 46.2N, 60.25W, June 28 1949, DF • Trout Brook, 4km (2.4) up from Mira River, 43b5, 45.95N, 60.17W, June 27 1994, R. Harding; **INVERNESS CO.** • Big Brook, 34d2, 45.81N, 61.23W, July 3 1998, DA • Gypsum mine, River Denys, 34d2, 45.81N, 61.23W, July 3 1998, DB • MacPhersons Brook, 34d2, 45.82N, 61.32W, July 14 1998, DA • Mull River, 34c5, 46.0N, 61.37W, July 15 1998, DA • Rhodena, 34c3, 45.72N, 61.36W, July 3 1998, DA; **VICTORIA CO.** • Baddeck, 38c4, 46.1N, 60.77W, June 22 1936, June 26 1936, JM, TF.

Genus ***STYLOGOMPHUS*** – Least Clubtail



Stylogomphus albistylus (Hagen in Sélys 1878)
Least Clubtail
gomphe à styles blancs
First: CBI (Brunelle 1997a), and LL (1985, S. Tynski, UCCB).
Global: G5
Nova Scotia: Green Status

This tiny species is an inhabitant of running waters such as trout streams, but is found at the slower streams and rivers as well, though not those with muddy banks or bottoms. Both males and females have light-coloured terminals and hence can be readily discriminated from the otherwise similar *Lanthus sp.* The discovery of this species in the Highlands is likely considering its distribution in New Brunswick.

CAPE BRETON CO. • Sydney, 43b3, 46.13N, 60.17W, August 15 1995, K. Whalen, UCCB • University College of Cape Breton campus, Sydney, 43b3, 46.13N, 60.17W, July 29 1985, ST.

FAMILY **CORDULEGASTRIDAE** – Spiketails

Genus ***CORDULEGASTER*** – Spiketails

This widely distributed genus is comprised of a small number of species of large size, green-eyed and with black bodies and brilliant yellow markings. Only two species are known in the Maritimes, and both are found on CBI. The common name alludes to the large ovipositor of the female's abdomen, with which she stabs eggs into the bottom of shallow waters. Spiketails can readily be discriminated from the otherwise similar macromids as they have two light stripes on the side of the thorax rather than the one of the cruisers.

Cordulegaster diastatops (Sélys 1854)

Delta-spotted Spiketail
cordulégastre aux yeux séparés
First: CBI (Walker 1958), LL (1936, T.N. Freeman, CNCI), HL (1954, R.D. Gray, NSM).
Global: G5
Nova Scotia: Green Status

This species is more abundant in the streams of the Highlands than it has ever before been seen in the Maritimes, and although it is found throughout the region it seems to increase in abundance further north. *Cordulegaster diastatops* can readily be discriminated from *C. maculata* by the presence of two well-separated series of arrows running down the length of the abdomen, rather than the more rounded, narrowly-separated spots of the latter species. Larvae of this species were taken in the small streams which cross Everlasting Barren although adults were not seen; adult presence on those streams may be confined to occasional visits by laying females. The delta-spotted spiketail is often observed at trickles in forests, or ditches which appear too small and ephemeral to support its larvae.

CAPE BRETON CO. • University College of Cape Breton campus, Sydney, 43b3, 46.13, 60.17, July 7 1986, ST; **INVERNESS CO.** • Ashfield, 34e1, 45.89N, 61.16W, June 26 1998, DA • Batemans Brook, Highland Road, 37c5, 46.48N, 60.78W, August 4 1997, PB • French Mountain, CBHNP, 37b2, 46.73N, 60.85W, July 1 1954, R.D. Gray, DF • Jim Cambells Barren, 37b4, 46.57N, 60.92W, July 9 1997, R.F. Lauff • Highland Road, beaver pond, 22.5km (14mi) north of the Hunters Mountain Gate, 38b1, 46.48N, 60.82W, August 1 1997, PB • Highland Road, beaver pond, 37.8km (23.5) north of the Hunters Mountain Gate, 37b5, 46.45N, 60.8W, August 1 1997, PB • Keppoch Highlands, 38a4, 46.07N, 61.04W, August 5 1998, DA • 'Radio Tower Bogs' stream, North Mountain, first stream across the Cabot Trail west of the radio tower, CBHNP, 37c1, 46.8N, 60.67W, July 16 1998, PB • west of Grand Falaise Picnic Site, CBHNP, 37a2, 46.67N, 60.94W, July 4 1983, RL; **RICHMOND CO.** • Loch Lomond, 39d2, 45.77N, 60.57W, July 7 1995, B.L. Musgrave, UCCB, August 9 1995, G.R. Macpherson, UCCB; **VICTORIA CO.** • 25km (15.5mi) south of Ingonish, 37e4, 46.5N, 60.43W, August 4 1948, EW • Baddeck, 38c4, 46.1N, 60.77W, June 29 1936, July 7 1936, July 10 1936, TF, July 18 1936, JM • 'brook', Highland Road, 15.6km (9.7mi) north of the Hunters Mountain Gate, 38b2, 46.23N, 60.82W, August 1 1997, PB • 'Cape Breton Highlands', 37e4, 46.55N, 60.48W, July 8 1998, DB • Dolye Road, 37c4, 46.49N, 60.74W, July 30 1998, DA, July 23 1998, DB • East Branch Indian Brook, Cheticamp Flowage Road, 37d3, 46.58N, 60.63W, September 30 1997, PB • 'Everlasting Barren Bog', northeast of Cheticamp Flowage dam,

37c2, 46.67N, 60.65W, September 30 1997, PB • Gisborne Flowage, 37d4, 46.55N, 60.57W, July 8 1998, DA • Highland Road, stream, 21.1km (13.1mi) north of the Hunters Mountain Gate, 38b2, 46.29N, 60.83W, August 1 1997, PB • MacKenize's Brook, 38a3, 46.17N, 61.05W, July 14 1998, DA • Nyanza, 38b4, 46.09N, 60.9W, August 2 1948, EW • Paquette Lake, CBHNP, 37e1, 46.83N, 60.43W, June 30 1983, July 4 1983, RA, August 14 1983, JEM, RM • Wreck Cove Brook at lowest crossing Wreck Cove Road, 37e4, 46.53N, 60.43W, August 2 1997, PB.

Cordulegaster maculatus Sélys 1854

Twin-spotted Spiketail
cordulégastre maculé
First: CBI (Calvert and Sheraton 1894, 'Cape Breton', citing Sélys 1878), LL (Walker 1958), and HL (1954, D.C. Ferguson, NSM).
Global: G5
Nova Scotia: Green Status

This is a large species, typically of the larger running waters, and its comparative rarity in the Highlands may be due to the scarcity of larger streams and rivers. The increased seasonal flow-rate of the larger streams associated with the Wreck Cove Hydroelectric Project may have reduced the silt beds which larvae of the species require as a microhabitat, thereby reducing abundance of the species on the northern plateau; however *C. diastatops*, with similar larval requirements, is present on those streams and its larvae have been collected from them in small numbers.

INVERNESS CO. • Benjies Lake, Mackenzie Mountain, CBHNP, 37b2, 46.74N, 60.81W, June 23 1983, RL • French Mountain, CBHNP, 37b2, 46.73N, 60.85W, July 1 1954, DF • Jim Cambells Barren, 37b4, 46.57N, 60.92W, July 9 1997, RL • MacPherson's Brook, 34d2, 45.82N, 61.32W, July 14 1998, DA • North Little River, Highway 105, 34c4, 45.67N, 61.36W, July 5 1997, PB • Plaister Mines, 38c3, 46.14N, 60.67W, June 14 1998, DA • Trous Mederick, 1km (0.62mi) east of Grand Étang, 37a4, 46.55N, 61.02W, July 7 1996, OF; **VICTORIA CO.** • Baddeck, 38c4, 46.1N, 60.77W, June 22 1936, June 23 1936, July 7 1936, July 8 1936, JM, TF • 'brook', Highland Road, 15.6km (9.7mi) north of the Hunters Mountain Gate, 38b2, 46.23N, 60.82W, August 1 1997, PB • East Indian Brook, 37d4, 46.29N, 60.64W, July 8 1998, DB • Warren Lake, CBHNP, 37e2, 46.72N, 60.39W, July 17 1953, MS.

Figure 23: ***Cordulegaster maculatus***

Female. This species shows to best effect the impressive ovipositor which has given the family its common name – that of *C. diastatops* is somewhat smaller. The females 'stand on their tails' in the air, poking their eggs rhythmically into the stream bottom.

FAMILY MACROMIIDAE – Cruisers

Genus *DIDYMOPS* – Stream Cruisers

This is a genus of two species, only one of which is found in the northeast. All Macromiidae are distinctive in having only one light bar on the side of the thorax.

Didymops transversa (Say 1839)

Stream Cruiser
macromie brune
First: CBI and LL (1983, R.A. Layberry, CNCI).
Global: G5
Canada: N5
Nova Scotia: Green Status

This is a brown, quick-flying species of running waters, usually found at the slower reaches. The stream cruiser is common throughout the Maritimes, though rarely abundant at the higher latitudes. It is large and of medium brownish colour with a pale yellow thoracic bar and similarly coloured terminalia. It is probably more common in the Lowlands than the two records suggest.

VICTORIA CO. • Warren Lake, CBHNP, 37e2, 46.72N, 60.39W, July 17 1953, MS, June 22 1983, RL.

Genus *MACROMIA* – River Cruisers

This is a genus of large dark species with brilliant green eyes and yellow markings. Only one species is known from our region.

Macromia illinoiensis Walsh 1862

Illinois River Cruiser
macromie noire
First: CBI and LL (1995, S.L. Smith, UCCB).
Global: G5
Canada: N5
Nova Scotia: Green Status

A spectacular species of running waters, usually in the faster reaches. This large species is the most dramatically coloured in the region, ebony and deep brown overall with rich yellow markings and the most brilliant green eyes of our fauna. It flies at great speed along the faster running waters, is decidedly difficult to net, and is likely more common on CBI than the one record suggests.

CAPE BRETON CO. • Sydney, 43b3, 46.13N, 60.17W, August 4 1995, S.L. Smith, UCCB.

Figure 24: ***Didymops transversa***

Male. Note the long legs and the single light stripe on the side of the thorax; both characteristic of the family Macromiidae.

FAMILY CORDULIIDAE – Emeralds

Genus *CORDULIA* – American Emerald

Cordulia shurtleffi Scudder 1866

American Emerald
cordulie de Shurtleffer
First: CBI and LL (Cook 1950), HL (1976, 'DSD and AW', NSM).
Global: G5
Canada: N5
Nova Scotia: Green Status

A common species of cattail and peatland ponds, the margins of lakes and running waters. This species is continental in range, and its presence throughout CBI comes as no surprise. It is the among the earliest of its suborder to emerge and in appearance similar to somatochloras, although the forked inferior terminal of the male when seen from the side is distinctive. It was very common at the Highlands barrens ponds in 1997.

INVERNESS CO. • Ashfield. 34e1. 45.89N. 61.16W. June 2 1998. June 3 1998. DA • Benjies Lake. Mackenzie Mountain. CBHNP. 37b2. 46.74N. 60.81W. June 23 1983. RL • bog. 1.1km (0.7mi) southwest of radio tower. North Mountain. CBHNP. 37c1. 46.82N. 60.67W. June 22 1983. RL • French Lake Bog. French Mountain. CBHNP. 37b2. 46.73N. 60.85W. June 27 1983. RL • French Lake Bog. French Mountain. CBHNP. 37b2. 46.73N. 60.85W. July 8 1983. RL • French Lake. CBHNP. 37b2. 46.73N. 60.85W. August 10 1976. 'DSD and AW'. NSM • Jim Cambells Barren. 37b4. 46.57N. 60.92W. July 9 1997. D. Harris. RL • Pleasant Bay. 37b1. 46.83N. 60.8W. June 25 1984. H.J. Teskey. CNCI • 'Radio Tower Bog'. North Mountain. 0.5km (0.3mi) (south of the Cabot Trail. CBHNP. 37c1. 46.8N. 60.67W. July 16 1998. PB; **VICTORIA CO.** • 3km (1.9mi) north-east of Baddeck Bridge. 38c3. 46.15N. 60.79W. July 11 1996. OF • Baddeck. 38c4. 46.10N. 60.77W. June 20 1936. June 26 1936. July 2 1936. July 3 1936. July 24 1936. July 21 1938. JM. TF. August 7 1948. DF. Cook 1950 • Big Baddeck. 38b3. 46.14N. 60.8W. June 14 1998. DA • Forks Baddeck. near. 38c4. 46.18N. 60.78W. July 9 1936. TF • Hunter Creek. Baddeck. 38. 46.1N. 60.77W. July 18 1936. TF • bog. southwest end Wreck Cove Dam 2. Ingonish 1 Reservoir. east of eastern canal road. 37d3. 46.62N. 60.63W. July 5 1997. PB • East Indian Brook. 37d3. 46.58N. 60.63W. July 8 1998. DA • 'Everlasting Barren Bog'. northeast of Cheticamp Flowage dam. 37c2. 46.67N. 60.65W. August 2 1997. September 30 1997. July 15 1998. PB • Highland Road. Mile 6 (9.6km). 38b3. 46.19N. 60.84W. August 1 1998. DA • MacMillan Flowage. north end near Highland Road. 37d4. 46.56N. 60.65W. July 5 1997. PB • 'small bog'. Cheticamp Flowage Road. 1km (0.62mi) west of Snowshoe Lake bend. 37c3. 46.63N. 60.65W. June 5 1997. PB • Wreck Cove Dam. near. 37e4. 46.57N. 60.5W. July 9 1998. DB • Wreck Cove Flowage. 37e4. 46.57N. 60.51W. July 8 1998. DA; **St. Paul Island,** Cabot Strait north of Cape Breton Island. 41b1. 47.18N. 60.15W. July 20 1955. July 21 1955. July 22 1955. July 25 1955. DF.

Genus *DOROCORDULIA* – Little Emeralds

These small, green-eyed dragonflies are similar to somatochloras in appearance, and it would be difficult to discriminate between the two species if the angle of the terminals viewed from above were not distinctive for both genders.

Dorocordulia lepida (Hagen in Sélys 1871)

Petite Emerald
First: CBI and HL (Lauff 1997), LL (1997, P.M. Brunelle).
Global: G5
Nova Scotia: Green Status

This is a small species of peatland and cattail ponds, the margins of lakes and running waters, and is distinguished by divergent terminals.

CAPE BRETON CO. • North Forchu Bog. Gabrus Lake to North Forchu road. north of North Forchu. 44b3. 46.25N. 59.27W. July 17 1998. PB; **INVERNESS CO.** • Caribou Barrens. CBHNP. 37c2. 46.72N. 60.67W. July 23 1996. RL; **VICTORIA CO.** • MacDonalds Pond. Cabot Trail. 37e5. 46.39N. 60.51W. August 3 1997. PB.

Dorocordulia libera (Sélys 1871)

Racket-tailed Emerald
cordulie écorcée
First: CBI (Brunelle 1997a), LL (1976, 'DSD and AW', NSM).
Global: G5
Nova Scotia: Green Status

A species of cattail and peatland ponds, with convergent terminals, and in well-preserved specimens a distinctive lateral flare to the abdomen end.

INVERNESS CO. • Black River Bog. 33d3. 46.16N. 61.28W. June 29 1998. DB; **RICHMOND CO.** • Lake Uist. 39d2. 45.8N. 60.57W. June 19 1989. BW; **VICTORIA CO.** • Jigging Cove Lake. CBHNP. 42a1. 46.78N. 60.33W. August 10 1976. 'DSD and AW'. NSM.

Genus *EPITHECA* – Baskettails

This is a genus of brown dragonflies of medium size, flying early in the season and often found in great numbers throughout the Maritimes. All are species of lakes, ponds, and the slow margins of running waters. Discrimination of two of the species is not possible on the wing, and although none have yet been reported from the Highlands they are quite possibly present there if only as vagrants. *Epitheca semiaquea*, reported from Maine and quite possibly present in the Maritimes, is very similar to *E. cynosura* and care should be taken in keying the latter with this in mind.

Epitheca canis (McLachlan 1886)

Beaverpond Baskettail
épithèque canine
First: CBI and LL (Cook 1950, as *Tetragoneuria canis*), HL (1998, D. Banks, DNRB).
Global: G5
Canada: N5
Nova Scotia: Green Status

The beaverpond baskettail can be discriminated from *E. spinigera* only by the form of the male terminals and female vulvar laminae.

CAPE BRETON CO. • Morrison Bridge Road, East Bay, 43a5, 46.0N, 60.42W, June 20 1991, T. Rolfe, UCCB • University College of Cape Breton campus, Sydney, 43b3, 46.13N, 60.17W, June 18 1986, ST; **INVERNESS CO.** • Ashfield, 34e1, 45.89N, 61.16W, June 2 1998, June 11 1998, June 22 1998, DA • Margaree Valley, 33e1, 46.33N, 61.08W, July 6 1949, DF, Cook 1950; **VICTORIA CO.** • 'Cape Breton Highlands', 37d4, 46.55N, 60.57W, July 8 1998, DB.

Epitheca cynosura (Say 1839)

Common Baskettail
épithèque à queue de beagle
First: CBI (Martin and Allyson 1987), LL (1994, R. Harding).
Global: G5
Canada: N5
Nova Scotia: Green Status

The common baskettail can readily be discriminated on the wing from other similar dragonflies known on CBI due to the large black triangle at the base of the hindwing.

CAPE BRETON CO. • Trout Brook, 4km (2.5mi) up from Mira River, 43b5, 45.95N, 60.17W, June 27 1994, R. Harding.

Epitheca spinigera (Sélys 1871)

Spiny Baskettail
épithèque épineuse
First: CBI (Walker and Corbet 1975), LL (1936, T.N. Freeman, CNCI).
Global: G5
Canada: N5
Nova Scotia: Green Status

The spiny baskettail can be discriminated from *E. canis* only by the form of the male terminals and female vulvar laminae.

RICHMOND CO. • Lake Uist, 39d2, 45.8N, 60.57W, July 3 1989, BW; **VICTORIA CO.** • Baddeck, 38c4, 46.1N, 60.77W, June 20 1936, TF • Nyanza, 38b4, 46.09N, 60.9W, August 2 1948, EW • West Middle River, 38a4, 46.12N, 60.94W, July 4 1936, TF.

Genus *HELOCORDULIA* – Sundragons

Helocordulia uhleri (Sélys 1871)

Uhler's Sundragon
épithèque d'Uhler
First: CBI and LL (1994, R. Harding), HL (1998, D. Anderson, DNRB).
Global: G5
Nova Scotia: Green Status

This blue-eyed species of running waters can be discriminated from similar species by the small but distinct pattern at the base of the hindwing, orange bordered by black. It flies at considerable speed along the shores of streams and rivers early in the season.

CAPE BRETON CO. • Trout Brook, 4km (2.5mi) up from Mira River, 43b5, 45.95N, 60.17W, June 27 1994, R. Harding; **VICTORIA CO.** • Wreck Cove Flowage, 37e4, 46.55N, 60.5W, July 8 1998, DA.

Genus *SOMATOCHLORA* – Striped Emeralds

This is a large genus of medium to large species found throughout the world but particularly in the subarctic zone. It contains some of the rarer species in North America and two of the species found in the Highlands are of particularly great interest. Species of the genus are dark in colouration with metallic highlights and emerald green eyes; most are variably marked in yellow, although some lack these markings, and usually are of slow running waters and acidic ponds.

Somatochlora albicincta (Burmeister 1839)

Ringed Emerald
cordulie annelée
First: CBI and HL (Brunelle 1999a).
Global: G5
Canada: N5
Nova Scotia: Indetermined

The ringed emerald is known in Nova Scotia only from CBI Highlands bogs and streams, and does not on CBI appear to favour the stillwater habitats at which it is most commonly encountered in northern New Brunswick. Care should be taken in keying this species to ensure that the specimen is not the very similar *S. brevicincta*.

INVERNESS CO. • Highland Road, Mile 28 (45km) pond on roadside pushoff, 38c4, 46.53N, 60.75W, July 8 1998, DA; **VICTORIA CO.** • 'Everlasting Barren Bog Stream', northeast of Cheticamp Flowage dam, 37c2, 46.67N, 60.65W, July 15 1998, PB • Wreck Cove Road, small bog at roadside, 37d4, 46.55N, 60.62W, July 25 1998, DA.

Figure 25: ***Somatochlora albicincta*** Male. Note the light annuli or rings on the abdomen, also seen in *S. cingulata* and *S. brevicincta*, although they do not extend over the top of the abdomen in the latter species.

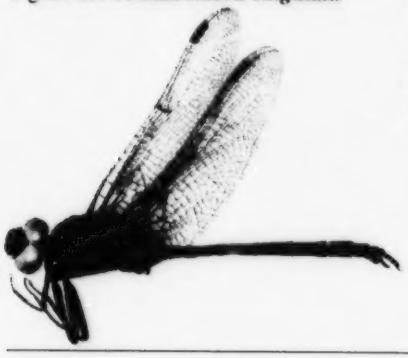
Somatochlora brevicincta Robert 1954

Québec Emerald
cordulie de Robert
First: CBI and HL (Brunelle 1998b).
Global: G2G3
Canada: N2N3
Nova Scotia: Indetermined

This is an early-flying species of acidic fens and peatlands, and one of the most interesting species to be found on CBI from the distribution standpoint.The four males taken by Biosystematics Research Center (BRC) workers on the western side of the plateau were at the time the only records of this species outside of northern Québec, approximately 800 kilometers away. The BRC specimens were found undetermined in the Canadian National Collection of Insects by Raymond Hutchinson and three of them have been confirmed by the author. Although the label information included with the specimens was brief, it appears that they were taken at or near ponded barrens on North Mountain within Cape Breton Highlands National Park. The species was not encountered at Everlasting Barren in the central northern plateau but may well have been present, and further work to determine if the species is still present in the Highlands is certainly warranted, particularly as it is one of the few odonates in Canada to be listed in the IUCN Red List of Threatened Animals (Moore 1997). The species has been taken at two locales in New Brunswick, and its range furthest to the south is currently Cumberland County, Nova Scotia (Brunelle 1998b).

INVERNESS CO. • bog, 1.1km (0.7mi) southwest of radio tower, North Mountain, CBHNP, 37c1, 46.82N, 60.67W, July 8 1983, RL • North Mountain, CBHNP, 37c1, 46.82N, 60.67W, August 15 1983, JEM, RM, August 9 1984, CNCI • 'Trap Bog', probably North Mountain, CBHNP, 37c1, 46.81N, 60.68W, July 8 1983, CNCI.

Figure 26: ***Somatochlora cingulata***



Male. Note the similarity to *S. albicincta* - this species should be looked for over lakes in the Lowlands.

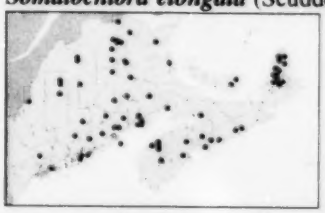
Somatochlora cingulata Sélys 1871

Lake Emerald
cordulie ceinturée
First: CBI and LL (Brunelle 1997a, St. Paul Island), HL (1997, R. Lauff, NSM).
Global: G5
Nova Scotia: Green Status

The lake emerald is a large, robust, strongly-marked species of lakes, peatland ponds, and slow reaches of the larger running waters. It is infrequently encountered throughout the Maritimes but is common in the Highlands, where it flies generally beyond easy reach low over the surfaces of the larger peat ponds with firm borders and natural lakes, but appears absent from the flowages. It is to date credited from the Lowlands only on the basis of collection on St. Paul Island.

CAPE BRETON CO. • Cricket Lake, North Forchu Bog, north of North Forchu, 44b3, 46.25N, 59.27W, July 17 1998, PB; **INVERNESS CO.** • Cranberry Barren, northwest of Cheticamp Flowage Dam, CBHNP, 37c2, 46.67N, 60.7W, August 20 1997, PB • Jim Cambells Lake, 37b4, 46.57N, 60.92W, July 9 1997, RL; **VICTORIA CO.** • 'Everlasting Barren Bog', northeast of Cheticamp Flowage dam, 37c2, 46.67N, 60.65W, August 28 1997, July 15 1998, PB • Wreck Cove Flowage, Wreck Cove Road, 37e4, 46.55N, 60.5W, August 2 1997, PB; **St. Paul Island,** Cabot Strait north of Cape Breton Island, 41b1, 47.18N, 60.15W, July 21 1955, DF.

Somatochlora elongata (Scudder 1866)



Ski-tailed Emerald
cordulie allongée
First: CBI, LL and HL (1983, J.E.H. Martin, CNCI).
Global: G5
Nova Scotia: Green Status

The ski-tailed emerald is the most frequently encountered species of its genus in the Maritimes, often found in substantial numbers flying along the banks of streams, rivers and lakes, particularly at the higher latitudes. It is abundant in the Highlands at streams and beaver ponds along Highland Road, and a female was taken while laying in a flark pond low on Everlasting Barren (ca. c16, Figure 6), although males were not seen patrolling any of the ponds.

INVERNESS CO. • Batemans Brook, Highland Road, 37c5, 46.48N, 60.78W, August 4 1997, PB • Highland Road, beaver pond, 23.6km (14.7mi) north of the Hunters Mountain Gate, 38b1, 46.48N, 60.82W, August 1 1997, PB • Keppoch Highlands, 38a3, 46.15N, 61.05W, August 5 1998, DA • Margaree Centre, fish pool, 38a1, 46.34N, 61.0W, July 22 1998, G. Peters • North Mountain, CBHNP, 37c1, 46.82N, 60.67, August 15 1983, JEM, RM • Rocky Brook, 37b4, 46.54N, 60.89W, August 8 1998, DA; **VICTORIA CO.** • Big Harbour Ducks Unlimited marsh, 38d3, 46.15N, 60.63W, August 21 1997, DB • 'Everlasting Barren Bog', northeast of Cheticamp Flowage dam, 37c2, 46.67N, 60.65W, August 28 1997, PB • freshwater marsh 0.1km (0.06mi) north of Freshwater Lake, CBHNP, 37e3, 46.64N, 60.42W, July 11 1983, JEM, RM • Highland Road, Mile 14.5 (23km), 38b1, 46.3N, 60.82W, August 8 1998, DA • Highland Road, Mile 6 (9.7km), 38b3, 46.19N, 60.84W, August 8 1998, DA • Highland Road, little pond, 6.4km (4mi) north of the Hunters Mountain Gate, 38b3, 46.17N, 60.83W, August 1 1997, PB • Highland Road, stream, 21.1km (13mi) north of the Hunters Mountain Gate, 38b2, 46.29N, 60.83W, August 1 1997, PB • Paquets Lake, CBHNP, 37e1, 46.83N, 60.43W, August 14 1983, JEM, RM • pond, Highway 105, approximately above Crescent Cove, 38c4, 46.12N, 60.73W, August 21 1997, PB.

Somatochlora forcipata (Scudder 1866)

Forcipate Emerald
cordulie fourchue
First: CBI and LL (Brunelle 1997a), HL (1983, R.A. Layberry, CNCI).
Global: G5
Nova Scotia: Indetermined

The forcipate emerald is an inhabitant of slow running waters, and is similar to but smaller than *S. incurvata*, from which the males can be discriminated by their strongly arched superior terminals when seen from the side. *S. forcipata* is widely distributed within the region and very common in Labrador, so its presence in the Highlands is not surprising, although it is not abundant anywhere in Nova Scotia.

INVERNESS CO. • bog, 2.4km (1.5mi) southwest of radio tower, North Mountain, CBHNP, 37c1, 46.81N, 60.68W, July 8 1983, RL • North Mountain, radio tower, CBHNP, 37c1, 46.82N, 60.67W, July 5 1983, RL; **VICTORIA CO.** • Baddeck, 38c4, 46.1N, 60.77W, June 20 1936, July 7 1936, July 20 1936, July 17 1938, JM, TF • Hunter Creek, Baddeck, 38, 46.1N, 60.77W, July 20 1936, TF.

Somatochlora incurvata Walker 1918

Incurvate Emerald
cordulie incurvée
First: CBI and LL (1997, P.M. Brunelle)
Global: G4
Canada: N4
Nova Scotia: Green Status

The incurvate emerald is a species of acidic fens, rarely seen at any form of open water. The range of *S. incurvata* is somewhat anomalous, extending in a comparatively narrow latitude band from the Maritimes and northern New England to the Great Lakes, and the CBI record is the second furthest north. Recent work in Maine, where it is a Species of Special Concern, indicates that it thrives in peatlands lacking ponds, although water-saturated *Sphagnum* is necessary. The male CBI specimen was patrolling a slightly inundated fen area peripheral to a sphagnum bog, well away from the ponds. The species warrants further survey work in the Lowlands and may be present in the Highlands.

INVERNESS CO. • sphagnum bog, Highway 105, 14km (8.7mi) north of Canso Causeway bridge, 34c3, 45.77N, 61.33W, August 27 1997, PB.

Figure 27: ***Somatochlora incurvata***

Male. The largest of the forcipate group of its genus, and one of the most elegant odonates in the region. *S. incurvata* is a species of great international conservation interest which apparently has its center of abundance in Acadia.

Somatochlora minor Calvert 1898

Ocellated Emerald
cordulie mineure
First: CBI (Walker 1925), LL (1936, T.N. Freeman, CNCI), HL (1997, D. Harris).
Global: G5
Canada: N5
Nova Scotia: Green Status

This is a small species of running waters, usually more abundant at slower reaches. It is found in much the same habitat and over a similar range as *S. elongata*, but is much smaller and the males can readily be determined by the sharply pointed overlapping terminals, seen from above. The females are also distinct in the comparatively large size and equilateral form of the ovipositor. Larvae were found in the small streams crossing Everlasting Barren (Figure 6, particularly 'Middle Stream') and one larva emerged in captivity late in the fall, indicating overwintering in the final instar. Males have been observed in abundance patrolling these streams and 'Everlasting Barren Bog Stream' in July, but flight is apparently over by August.

INVERNESS CO. • Jim Cambells Barren, 37b4, 46.57N, 60.92W, July 9 1997, D. Harris; **VICTORIA CO.** • Baddeck, 38c4, 46.1N, 60.77W, July 22 1936, JM, July 24 1938, TF • Big Barren, 38b2, 46.27N, 60.85W, August 1 1998, DA • 'brook', Highland Road, 15.6km (9.7mi) north of the Hunters Mountain Gate, 38b2, 46.23N, 60.82W, August 1 1997, PB • 'Everlasting Barren Bog', northeast of Cheticamp Flowage dam, 37c2, 46.67N, 60.65W, September 30 1997, July 15 1998, PB • Gisborne Flowage, 37d4, 46.55N, 60.57W, July 8 1998, DA • Hunter Creek, Baddeck, 38, 46.1N, 60.77W, July 18 1936, July 22 1936, TF.

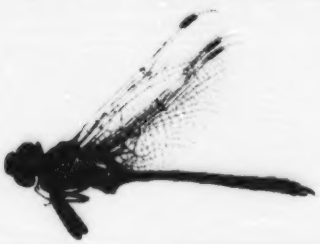
Somatochlora septentrionalis (Hagen 1861)

Muskeg Emerald
cordulie septentrionale
First: CBI and HL (Brunelle 1997a).
Global: G5
Canada: N5
Nova Scotia: Yellow Status

This high northern species is apparently obligate to the flark type ponds of the Highlands barrens, although in New Brunswick found at the depositional margins of firm edged ponds where there are extensive mucky deposits. The single record of this species from the CNCI, collected by J.H. McDunnough, then of the Nova Scotia Museum, in 1941 from 'the mountains above Pleasant Bay', was the first suggestion that the Highlands housed a subarctic odonate fauna. The species is not known from the Maritimes or New England (the report in Harvey (1901) of the species in Maine was refuted in Williamson (1909)), although it is found on the island of Newfoundland and is common in Labrador and the north in general. Curiously enough it was not found by the BRC workers in the 1980's, but its presence in the Highlands was confirmed by the collection of a laying female in a larger pond of Everlasting Barren and by a number of advanced larvae taken in the flark ponds of that barren (ca. k7, k8, Figure 6). One of these larvae emerged in captivity in the fall, further confirming the species presence, that it is not uncommon on the barren, and that it overwinters in the final instar. This species definitely warrants further survey work, as this may be its most southern range extension.

INVERNESS CO. • 'mountains above Pleasant Bay', CBHNP, 37c1, 46.82N, 60.8W, July 24 1941, JM • 'Radio Tower Bog 1', North Mountain, adjacent to the Cabot Trail, CBHNP, 37c1, 46.8N, 60.67W, July 16 1998, PB • 'Radio Tower Bog 2', North Mountain, 0.5km (0.3mi) south of the Cabot Trail, CBHNP, 37c1, 46.8N, 60.67W, July 16 1998, PB; **VICTORIA CO.** • 'Everlasting Barren Bog', northeast of Cheticamp Flowage dam, 37c2, 46.67N, 60.65W, August 28 1997, July 15 1998, PB.

Figure 28: ***Somatochlora septentrionalis*** Male. One of the few species of its genus with dark markings at the base of the hindwing. The others, *S. franklini* and *S. whitehousei*, are both possibles for the Highlands, so care should be taken when determining this species.



Somatochlora tenebrosa (Say 1839)

Clamp-tipped Emerald
cordulie ténebreuse
First: CBI and HL (1999, D. Anderson, DNRB).
Global: G5
Nova Scotia: Indetermined

The clamp-tipped emerald is very rare in Acadia, and its record on CBI is close to the highest it has every been taken. It is a species of forest streams, and marked shade-loving, though sometimes taken late in the day foraging in sun-lit roads and clearings.

VICTORIA CO. • Mathesons Lake Road, 38c2, 46.23N, 60.67W, August 8 1999, DA.

Somatochlora walshii (Scudder 1866)

Brush-tipped Emerald
cordulie de Walsh
First: CBI and LL (Brunelle 1997a), HL (1998, D. Anderson, DNRB).
Global: G5
Nova Scotia: Green Status

The male of this active little species is easily discriminated from the similarly sized *S. minor* and *Cordulia shurtleffi* by the dense hairs on the terminals, but the female requires careful keying. Males of the brush-tippd emerald are often encountered flying at high speed just above the surface of dirt roads; females are often found in sun-lit patches in the woods.

INVERNESS CO. • Keppoch Highlands, 38a3, 46.15N, 61.05W, August 5 1998, DA • sphagnum bog, Highway 105, 14km (8.7mi) north of Canso Causeway bridge, 34c3, 45.77N, 61.33W, September 6 1997, PB; **RICHMOND CO.** • Point Michaud, 39d4, 45.58N, 60.7W, August 23 1998, DA; **VICTORIA CO.** • Baddeck, 38c4, 46.1N, 60.77W, July 6 1954, R.D. Gray, NSM • MacDonalds Pond, Cabot Trail, 37e5, 46.39N, 60.51W, August 3 1997, PB.

Somatochlora williamsoni Walker 1907

Williamson's Emerald
cordulie de Williamson
First: Nova Scotia, CBI and LL (1999, D. Anderson, DNRB).
Global: G5
Canada: N5
Nova Scotia: Indetermined

A large species of slow running waters, Williamson's emerald is somewhat rare in Acadia. It is difficult to discriminate from *S. elongata* except in its lack of two yellow markings on the side found on the thorax of that species, however *S. williamsoni* can show such markings shortly after emergence, so both genders have to be carefully keyed.

VICTORIA CO. • North Branch Plaster Pond, 38c3, 46.18N, 60.78W, June 27 1999, July 3 1999, DA.

FAMILY **LIBELLULIDAE** – Skimmers

Genus ***LEUCORRHINIA*** – Whitefaces

This genus is comprised of small dragonflies of similar size to the smaller corduliids. They are dark with bright white faces, variable markings often in red or yellow, and their range generally extends well to the north and south of Acadia. Determination is, as with sympetrums, by the form of the secondary genitalia of the male and the vulvar laminae of the female. *Leucorrhinia patricia* is known in New Brunswick at latitudes comparable to CBI and may be present at the Highlands barrens.

Leucorrhinia frigida Hagen 1890

Frosted Whiteface
leucorrhine frigide
First: CBI and HL (Lauff 1996).
Global: G5
Canada: N5
Nova Scotia: Green Status

This small species of ponds is dark overall with a white pruinessence which develops at the base of the male's abdomen as it matures - looking appropriately like frost. It is probably more common on CBI than the two records suggest.

INVERNESS CO. • Caribou Barrens, CBHNP, 37c2, 46.72N, 60.67W, June 15 1996, RL; **VICTORIA CO.** • MacLeods Lake, 38c2, 46.28N, 60.34W, August 4 1999, DA.

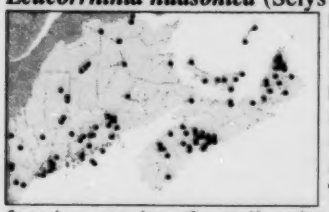
Leucorrhinia glacialis Hagen 1890

Crimson-ringed Whiteface
leucorrhine glaciale
First: CBI (Calvert and Sheraton 1894), LL (1955, D.C. Ferguson, NSM), HL (1941, R.H. McDunnough, CNCI).
Global: G5
Canada: N5
Nova Scotia: Green Status

A species of peatland ponds and other slow waters, the crimson-ringed whiteface has a ruby red thorax and ebony abdomen, and appears to be common in the Highlands and rarer in the Lowlands. It is difficult to discriminate from *L. proxima* in either gender.

CAPE BRETON CO. • North Forchu Bog, Gabrus Lake to North Forchu road, north of North Forchu, 44b3, 46.25N, 59.27W, July 17 1998, PB; **INVERNESS CO.** • 0.7km (0.4mi) east of the MacKenzie Mountain Fire Tower, CBHNP, 37b2, 46.75N, 60.83W, July 5 1983, RL • Batemans Brook, Highland Road, 37c5, 46.48N, 60.78W, August 4 1997, PB • Benjies Lake, Mackenzie Mountain, CBHNP, 37b2, 46.74N, 60.81W, June 23 1983, RL • bog, 1.1km (0.7mi) southwest of radio tower, North Mountain, CBHNP, 37c1, 46.82N, 60.67W, July 8 1983, RL • 'Cape Breton Highlands', 37D3G11, 46.62N, 60.63W, July 8 1998, DB • Gypsum mine, River Denys, 34d2, 45.81N, 61.23W, July 3 1998, DB • Jim Cambells Barren, 37b4, 46.57N, 60.92W, July 9 1997, RL • 'mountains above, Pleasant Bay' CBHNP, 37c1, 46.82N, 60.8W, July 24 1941, JM • 'Radio Tower Bog 2', North Mountain, 0.5km (0.3mi) south of the Cabot Trail, CBHNP, 37c1, 46.8N, 60.67W, July 16 1998, PB • 'Trap Bog', probably North Mountain, CBHNP, 37c1, 46.81N, 60.68W, July 8 1983, Wood, CNCI • west of Grand Falaise Picnic Site, CBHNP, 37a2, 46.67N, 60.94W, June 23 1983, RL; **VICTORIA CO.** • 0.3km (0.2mi) west of Round Lake, CBHNP, 37d1, 46.81N, 60.51W, July 10 1983, RL • 1.6km (1mi) south of Two Island Lake, CBHNP, 37d3, 46.65N, 60.58W, June 24 1983, RL • 3km (1.9mi) northeast of Baddeck Bridge, 38c3, 46.15N, 60.79W, July 11 1996, OF • bog, east of Park Spur, 37c4, 46.52N, 60.7W, July 23 1998, DB • bog, southwest end Wreck Cove Dam 2, Ingonish 1 Reservoir, east of eastern canal road, 37d3, 46.62N, 60.63W, July 5 1997, PB • 'Everlasting Barren Bog', northeast of Cheticamp Flowage dam, 37c2, 46.67N, 60.65W, August 2 1997, July 15 1998, PB • Everlasting Barren, west, 37c4, 45.56N, 60.75W, August 8 1998, DA • Highland Road, 38b5, 45.97N, 60.88W, July 4 1983, BW • Highland Road, Mile 29 (46.7km) bog, 37C4, 46.52N, 60.7W, July 30 1998, DA • MacDougalls Lake, CBHNP, 37e2, 46.67N, 60.44W, July 2 1983, RL • Mary Ann Falls Road, CBHNP, 42a1, 46.77N, 60.37W, July 6 1984, H.J. Teskey, CNCI • North Mountain, CBHNP, 36d5, 46.88N, 60.58W, August 2 1953, DF; **St. Paul Island,** Cabot Strait north of Cape Breton Island, 41b1, 47.18N, 60.15W, July 20 1955, July 22 1955, July 26 1955, DF.

Leucorrhinia hudsonica (Sélys 1850)



Hudsonian Whiteface
leucorrhine hudsonienne
First: CBI and LL (Cook 1950), HL (1983, R.A. Layberry, CNCI).
Global: G5
Canada: N5
Nova Scotia: Green Status

The hudsonian whiteface is a species of cattail and peatland ponds, and other small, slow waters. This species is yellow and black when teneral, and care should be taken not to mistake it for *Sympetrum danae*. The hudsonian whiteface is the most common member of the genus in the region and the most frequently encountered on CBI in all habitats. Larvae of the species were numerous in the peat ponds of Everlasting Barren and some emerged in aquaria during the fall, indicating that the species overwinters in the final instar.

CAPE BRETON CO. • Enon, 39e2, 45.81N, 60.53W, June 20 1994, Francis J.M., V. Jessome, UCCB • Sydney Mines, 43b2, 46.23N, 60.23W, June 20 1994, J.M. Francis, UCCB; **INVERNESS CO.** • 0.7km (0.4mi) east of the MacKenzie Mountain Fire Tower, CBHNP, 37b2, 46.75N, 60.83W, June 30 1983, RL • Ashfield, 34e1, 45.89N, 61.16W, June 22 1998, DA, August 12 1997, DB • Ashfield Road, beaver pond, 34e1, 45.89N, 61.16W, August 11 1997, DB, June 22 1998, DA • Black River Bog, 33d3, 46.16N, 61.28W, June 29 1998, DB • bog, 1.1km (0.7mi) southwest of radio tower, North Mountain, CBHNP, 37c1, 46.82N, 60.67W, June 22 1983, June 20 1983, June 30 1983, RL • Fishing Cove River, MacKenzie Mountain, CBHNP, 37b2, 46.75N, 60.83W, July 4 1983, RL • French Mountain Skyline Trail, CBHNP, 37b2, 46.72N, 60.86W, July 1 1983, RL • Hays River Bog, 33d4, 46.12N, 61.23W, July 19 1998, DA • Jim Cambells Barren, 37b4, 46.57N, 60.92W, July 9 1997, RL • MacKenzie Mountain Fire Tower, CBHNP, 37b2, 46.75N, 60.84W, July 15 1983, CNCI • North Mountain, CBHNP, 37c1, 46.82N, 60.67W, August 15 1983, JEM, RM, June 27 1984, H.J. Teskey, CNCI • 'Radio Tower Bog 2', North Mountain, 0.5km (0.3mi) south of the Cabot Trail, CBHNP, 37c1, 46.8N, 60.67W, July 16 1998, PB • sphagnum bog, Highway 105, 14km (8.7mi) north of Canso Causeway bridge, 34c3, 45.77N, 61.33W, July 14 1998, PB • 'Trap Bog', probably North Mountain, CBHNP, 37c1, 46.81N, 60.68W, July 8 1983, coll. 'Wood', CNCI; **VICTORIA CO.** • 0.3km (0.19mi) southwest of Jigging Cove Lake, CBHNP, 42a1, 46.79N, 60.33W, June 28 1983, RL • 1.6km (1mi) south of Two Island Lake, CBHNP, 37d3, 46.65N, 60.58W, June 24 1983, RL • Baddeck, 38c4, 46.1N, 60.77W, July 3 1947, DF, Cook 1950 • Big Barren, 38b2, 46.27N, 60.85W, August 1 1998, DA • bog, southwest end Wreck Cove Dam 2, Ingonish 1 Reservoir, east of eastern canal road, 37d3, 46.62N, 60.63W, July 5 1997, PB • 'Cape Breton Highlands', 37d3, 46.62N, 60.63W, July 8 1998, DB • 'Everlasting Barren Bog', northeast of Cheticamp Flowage dam, 37c2, 46.67N, 60.65W, September 30 1997, July 15 1998, PB • Highland Road, Mile 29 (46.7km) bog, 37c4, 46.52N, 60.7W, July 30 1998, DA • Jigging Cove Lake, CBHNP, 42a1, 46.79N, 60.33W, June 28 1983, RL, August 15 1984, RM • MacDonalds Pond, Cabot Trail, 37e5, 46.39N, 60.51W, August 3 1997, PB • 'small bog', Cheticamp Flowage Road, 1km (0.62mi) west of Snowshoe Lake bend, 37c3, 46.63N, 60.65W, June 5 1997, PB • Wreck Cove Flowage, 37e4, 46.57N, 60.51W, July 8 1998, DA • Wreck Cove Road, 37d4, 46.55N, 60.62W, July 25 1998, DA; **St. Paul Island,** Cabot Strait north of Cape Breton Island, 41b1, 47.18N, 60.15W, July 25 1955, DF.

Leucorrhinia intacta (Hagen 1861)

Dot-tailed Whiteface
leucorrhine mouchetée
First: CBI and LL (Cook 1950).
Global: G5
Canada: N5
Nova Scotia: Green Status

This is a distinctive species of rich ponds throughout the region, not found at peatlands, somewhat southern in distribution and not known in Newfoundland. It's apparent absence from the Highlands is not therefore surprising, particularly as the cattail pond habitat is rare on the plateau. Males are readily identified by the single large yellow spot on the otherwise black abdomen, females by the larger size of the dorsal yellow spot on the seventh abdominal segment. In Maine, androchromatic females are not uncommon.

VICTORIA CO. • Baddeck, 38c4, 46.1N, 60.77W, August 7 1948, June 29 1949, DF, Cook 1950.

Leucorrhinia proxima Calvert 1890

Red-waisted Whiteface
leucorrhine apprivoisée
First: CBI and LL (Walker and Corbet 1975), HL (1983, R.A. Layberry, CNCI).
Global: G5
Canada: N5
Nova Scotia: Green Status

This species is found at most ponds and lakes in the region and to the north, and is common at the Highlands lakes. It is difficult to discriminate from *L. glacialis* without careful keying.

INVERNESS CO. • Ashfield, 34e1, 45.89N, 61.16W, June 2 1998, June 22 1998, August 5 1998, DA • Ashfield Road, beaver pond, 34e1, 45.89N, 61.16W, June 19 1998, June 22 1998, August 5 1998, DA • Benjies Lake, Mackenzie Mountain, CBHNP, 37b2, 46.74N, 60.81W, June 23 1983, RL • Big Brook, Georgia Pacific Mine, 34d2, 45.81N, 61.23W, June 8 1998, June 26 1998, DA • Black River Bog, 33d3, 46.16N, 61.28W, June 29 1998, DB • Gypsum mine, River Denys, 34d2, 45.81N, 61.23W, July 3 1998, DB • French Lake Bog, French Mountain, CBHNP, 37b2, 46.73N, 60.85W, July 8 1983, RL • MacIntyre Mountain, 34c3, 45.77N, 61.35W, June 19 1998, DA • MacIntyre Mountain Road, beaver pond, 34c3, 45.77N, 61.35W, June 19 1998, DA • 'Trap Bog', probably North Mountain, CBHNP, 37c1, 46.81N, 60.68W, July 8 1983, coll. 'Wood', CNCI; **RICHMOND CO.** • bog, Highway 104, Cannes, 39a4, 45.64N, 60.98W, August 1 1998, DA • Lake Uist, 39d2, 45.8N, 60.57W, June 19 1989, BW; **VICTORIA CO.** • 0.3km (0.19mi) west of Round Lake, CBHNP, 37d1, 46.81N, 60.51W, July 10 1983, RL • Big Harbour Ducks Unlimited Marsh, 38d3, 46.15N, 6063W, August 11 1997, DB • freshwater marsh 0.1km (0.06mi) north of Freshwater Lake, CBHNP, 37e3, 46.64N, 60.42W, June 23 1983, RL • Paquets Lake, CBHNP, 37e1, 46.83N, 60.43W, June 30 1983, RL • Plaister Mines, pond, 38c3, 46.14N, 60.67W, July 29 1998, DA • Point Bevis, Baddeck, 38d3, 46.1N, 60.77W, July 19 1943, T.K. Bentley, NSM • Red Point West, 39a1, 45.92N, 60.95W, August 2 1998, DB.

Genus ***LIBELLULA*** – Skimmers

This genus is comprised of medium to large dragonflies, generally with wide abdomens and great breadth of hindwing. The list for CBI includes only species common throughout the region, which is not surprising as the skimmers are most diverse to the south.

Libellula exusta Say 1839

White Corporal
First: CBI and HL (Brunelle 1997a).
Global: G4
Nova Scotia: Green Status

This species is usually encountered in the well-oxygenated slow margins and coves of lakes. Its presence on CBI is somewhat surprising given its southern range, and it is unlikely to be found in the Highlands as it appears to prefer protected areas. The male is distinctive with its entirely chalk-white abdomen and unmarked wings (differing from *L. lydia* which although also having a white abdomen has strongly marked wings), the female somewhat difficult to discriminate from that of *L. julia*. This species and the following are often placed in the genus *Ladona* by United States workers.

RICHMOND CO. • Lake Uist, 39d2, 45.8N, 60.57W, June 21 1989, BW.

Figure 29: ***Libellula exusta*** Male.

Figure 30: ***Libellula julia*** Male.

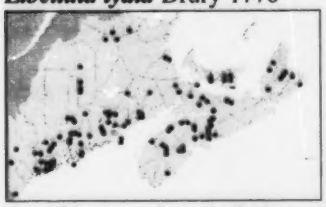
Libellula julia Uhler 1857

Chalk-fronted Corporal
la julienne
First: CBI and LL (Cook 1950), HL (1983, R.A. Layberry, CNCI).
Global: G5
Canada: N5
Nova Scotia: Green Status

This is a very common species of all slow waters in the Maritimes. It is abundant in the Highlands, where its habit of perching in small depressions in the barrens affords it some protection from the constant winds. The male is distinctive, with the top of the abdomen white in the basal half only, older females haveing a similar pattern in gray.

CAPE BRETON CO. • North Forchu Bog, Gabrus Lake to North Forchu road, north of North Forchu, 44b3, 46.25N, 59.27W, July 17 1998, PB; **INVERNESS CO.** • Ashfield, 34e1, 45.89N, 61.16W, 6 2 98, June 11 1998, June 12 1998, DA • Jim Cambells Barren, 37b4, 46.57N, 60.92W, July 9 1997, RL • Meat Cove, 36d3, 47.03N, 60.57W, July 16 1997, RL • 'Radio Tower Bog 1', North Mountain, adjacent to the Cabot Trail, CBHNP, 37c1, 46.8N, 60.67W, July 16 1998, PB; **RICHMOND CO.** • Lake Uist, 39d2, 45.8N, 60.57W, July 3 1989, BW; **VICTORIA CO.** • Baddeck, 38c4, 46.1N, 60.77W, August 7 1948, August 4 1950, DF, Cook 1950 • bog, southwest end Wreck Cove Dam 2, Ingonish 1 Reservoir, east of eastern canal road, 37d3, 46.62N, 60.63W, July 5 1997, PB • 'Cape Breton Highlands', 37d3, 46.61N, 60.63W, July 25 1998, DA • Forks Baddeck, near, 38c4, 46.18N, 60.78W, July 9 1934, July 9 1936, TF • freshwater marsh 0.1km (0.06mi) north of Freshwater Lake, CBHNP, 37e3, 46.64N, 60.42W, July 6 1983, July 11 1983, RL • Jigging Cove Lake, CBHNP, 42a1, 46.78N, 60.33W, August 10 1976, 'DSD and AW', NSM • MacDonalds Pond, Cabot Trail, 37e5, 46.39N, 60.51W, August 3 1997, PB • MacDougalls Lake, CBHNP, 37e2, 46.67N, 60.44W, July 2 1983, RL • Mary Ann Falls Road, CBHNP, 42a1, 46.77N, 60.37W, July 6 1984, H.J. Teskey, CNCI • Paquets Lake, CBHNP, 37e1, 46.83N, 60.43W, June 30 1983, RL • Point Bevis, Baddeck, 38d3, 46.1N, 60.77W, July 8 1945, NSM • Red Point West, 39a1, 45.92N, 60.95W, August 2 1998, DB.

Libellula lydia Drury 1770



Common Whitetail
la lydienne
First: CBI and LL (1975, D. Blake, DNRI), HL (1998, D. Anderson, DNRB).
Global: G5
Canada: N5
Nova Scotia: Green Status

A striking species of all slow waters, common in the southern parts of the region, less so to the north. The males have paper-white abdomens and large black bars across the wings; the females are difficult to discriminate from *L. pulchella* (not yet known from CBI) with basal, nodal and apical spots to all four wings.

CAPE BRETON CO. • Louisburg, 44d1, 45.94N, 60.0W, July 5 1975, D. Blake, DNRI • University College of Cape Breton campus, Sydney, 43b3, 46.13N, 60.17W, July 24 1986, ST; **INVERNESS CO.** • Big Brook, 34d2, 45.81N, 61.23W, June 26 1998, DA • Doyle Raod, Margaree, 33e1, 45.32N, 61.08W, July 4 1998, DA • Turner Brook, 37a4, 46.52N, 60.93N, August 8 1998, DA; **VICTORIA CO.** • Big Harbour Ducks Unlimited Marsh, 38d3, 46.15N, 60.63W, August 11 1997, DB • Bouldarie island, 38e2, 46.14N, 60.5W, July 10 1998, DB • pond, Highway 105, above Crescent Cove, 38c4, 46.12N, 60.73W, August 21 1997, PB • 'St. Anns Picnic Park marsh', North Gut, St. Anns Harbour, Cabot Trail, northwest of St. Anns, 38d3, 46.21N, 60.63W, August 21 1997, PB.

Figure 31: ***Libellula lydia*** Male.

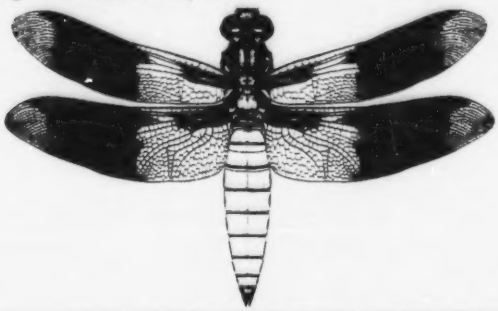


Figure 32: ***Libellula quadrimaculata*** Male.

Libellula quadrimaculata Linnaeus 1758

Four-spotted Skimmer
la quadrimaculée
First: CBI (Walker 1933), LL (1936, T.N. Freeman, CNCI), HL (1953, D.C. Ferguson, NSM).
Global: G5
Canada: N5
Nova Scotia: Green Status

The four-spotted skimmer is a species of cattail ponds and the slow margins of lakes and running waters, common both in the north and south of North America, Europe and Asia. This is probably the most frequently encountered species of dragonfly in the northern hemisphere. It is amber to dull brown in colour with variable orange along the front wing margins, black triangles at the hindwing bases and variable black spots at the midpoint of the front margin of all wings.

CAPE BRETON CO. • Catalone Point, 43d5, 46.01N, 59.94W, August 3 1998, DA • North Sydney, 43b2, 46.2N, 60.25W, July 8 1967, BW • Scatarie Island, 45a4, 46.0N, 59.75W, July 1 1917, A.G. Huntsman, Walker 1933, ROM • Sydney River, pond beside Causeway Road, 43b4, 46.1N, 60.24W, July 5 1990, BW • University College of Cape Breton campus, Sydney, 43b3, 46.13N, 60.17W, June 18 1985, July 24 1991, ST; **INVERNESS CO.** • Ashfield, 34e1, 45.89N, 61.16W, June 11 1998, June 12 1998, August 12 1997, DA, DB • bay 16km (10mi) north of Port Hastings, 34b2, 45.77N, 61.5W, August 11 1948, EW • beaver pond, Ashfield Road, 34e1, 45.89N, 61.23W, August 11 1997, DB • Black River Bog, 33d3, 46.16N, 61.28W, June 29 1998, DB • DNRB range, Queensville, 33c3, 45.73N, 61.36W, July 24 1998, DB • French Mountain, CBHNP, 37b2, 46.73N, 60.85W, June 13 1953, DF • Grand Falaise Picnic Site, west of, CBHNP, 37a2, 46.67N, 60.94W, June 23 1983, RL • Gypsum mine, River Denys, 34d2, 45.81N, 61.23W, July 3 1998, DB • Lake Ainslie, northeast shore of Loch Ban, 33d3, 46.18N, 61.23W, July 25 1998, G. Peters • MacLean Point, Denys Basin, 39a1, 45.9N, 61.03W, August 2 1998, DB • Melford, Beaver Brook, 34d1, 45.73N, 61.33W, June 19 1998, DB • Rough Brook Road, 33d3, 45.73N, 61.33W, July 24 1998, DB • sphagnum bog, Highway 105, 14km (8.7mi) north of Canso Causeway bridge, 34c3, 45.77N, 61.33W, August 1 1997, August 27 1997, September 6 1997, July 14 1998, PB; **VICTORIA CO.** • Baddeck, 38c4, 46.1N, 60.77W, June 25 1945, NSM, July 6 1954, R.D. Gray, NSM • Big Harbour Ducks Unlimited marsh, 38d3, 46.15N, 60.63W, August 11 1997, DB • bog, southwest end Wreck Cove Dam 2, Ingonish 1 Reservoir, east of eastern canal road, 37d3, 46.62N, 60.63W, July 5 1997, PB • Brian Point, 38b4, 46.06N, 60.88W, August 17 1997, DB • Forks Baddeck, near, 38c4, 46.18N, 60.78W, June 23 1936, August 20 1936, TF • freshwater marsh 0.1km (0.06mi) north of Freshwater Lake, CBHNP, 37e3, 46.64N, 60.42W, July 6 1983, JEM, RM • MacDonalds Pond, Cabot Trail, 37e5, 46.39N, 60.51W, August 3 1997, PB • Plaster Provincial Park, Cabot Trail, 37e5, 46.42N, 60.48W, August 4 1997, PB • Red Point West, 39a1, 45.92N, 60.95W, August 2 1998, DB • 'St. Anns Picnic Park Marsh', North Gut, St. Anns Harbour, Cabot Trail, northwest of St. Anns, 38d3, 46.21N, 60.63W, August 21 1997, PB • Washabuck, 38c4, 46.07N, 60.84W, July 4 1945, NSM, July 1 1947, DF, Cook 1950; **St. Paul Island,** Cabot Strait north of Cape Breton Island, 41b1, 47.18N, 60.15W, July 22 1955, July 25 1955, DF.

Genus ***PANTALA*** – Gliders

This is a genus of two large species notable for their extraordinary wandering abilities, supported by the great breadth of the wings. *Pantala flavescens* has been taken 800 kilometers out to sea and is known worldwide. These are large dragonflies, similar in general appearance to *Libellula sp.*

Pantala flavescens (Fabricius 1798)

Wandering Glider
pantale flavescente
First: CBI, LL and HL (Brunelle 1999a).
Global: G5
Nova Scotia: Green Status

This is a famous migratory species which may not fulfill a complete lifestage development in the Maritimes. It is golden brown with clear wings, an orange mask and golden eyes, and apparently moves in from the Atlantic in August and possibly moves up the shore from New England and below. The breeding habitat is small ephemeral waters such as quarry ponds and the seasonally isolated pools of rivers. The species was encountered on the narrow Lowlands margin to the Highlands in 1997, particularly on the dirt road up to the plateau at Wreck Cove. Subsequently males were observed guarding ponds in Everlasting Barren and mating and subsequent laying were also observed. It is not known whether the larvae survive winter in these ponds; larval collecting in late September did not yield the species at the ponds where laying had been observed in August.

INVERNESS CO. • French Lake, Cabot Trail, CBHNP, 37b2, 46.73N, 60.87W, August 29 1997, PB; **VICTORIA CO.** • 'Everlasting Barren Bog', northeast of Cheticamp Flowage dam, 37c2, 46.67N, 60.65W, August 28 1997, PB • Halfway Brook, 37e1, 46.82N, 60.48W, August 19 1984, JEM • Wreck Cove Road near the Nova Scotia Power powerhouse, 37e4, 46.53N, 60.43W, August 3 1997, PB.

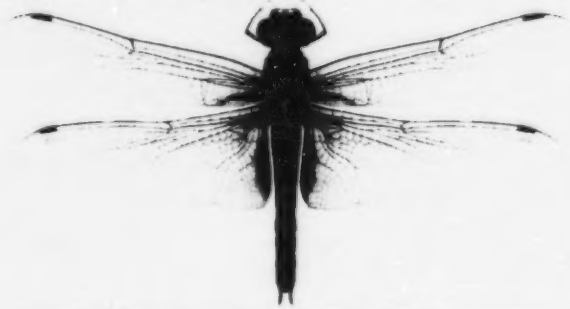
Pantala hymenaea (Say 1839)

Spot-winged Glider
pantale bimaculée
First: CBI and LL (Brunelle 1997a).
Global: G5
Nova Scotia: Green Status

This species is darker than *P. flavescens*, with a brilliant red eye and face and a dark basal spot to the hindwings. It was encountered in CBI on the dirt road up to the plateau from Wreck Cove and may visit the barrens ponds as does *P. flavescens*.

VICTORIA CO. • Cabot Trail at Neils Harbour, CBHNP, 42a1, 46.82N, 60.35W, August 15 1996, PB • Plaster Provincial Park, Cabot Trail, 37e5, 46.42N, 60.48W, August 8 1997, PB.

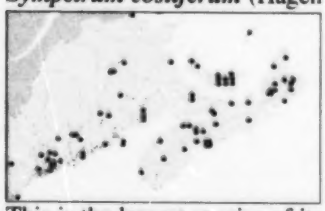
Figure 33: ***Pantala hymenaea*** Female.



Genus *SYMPETRUM* – Meadowhawks

This genus is comprised of small dragonflies, the mature males of which are red (except *S. danae*), the females generally brown. They are widely distributed, but tend to be northern. The taxonomy of this genus is the most problematic in the area, with *S. janeae* having only recently been described (Carle 1992) and not fully accepted. There are also problems associated with discriminating between *S. internum* and *S. rubicundulum* and we must await a resolution of the taxonomy of the genus before finalizing distribution. Meadowhawks fly in the latter part of the summer and fall and are often present in extraordinary numbers. Discrimination to species is by the lateral profile of the male secondary genitalia and ventral view of the female vulvar laminae.

Sympetrum costiferum (Hagen 1861)



Saffron-winged Meadowhawk
sympétrum rubigineux
First: CBI (Walker and Corbet 1975), LL (1984, R.J. Martin, CNCI), HL (1917, F. Johansen, CNCI).
Global: G5 *Canada:* N5
Nova Scotia: Green Status

This is the largest species of its genus in the region, lacking dramatic body markings but with strong amber colouring along the front margins of the wings which fades with age.

CAPE BRETON CO. • Gillis Lake, 43a4, 46.07N, 60.4W, September 25 1995, C. Murphy, UCCB • Glace Bay, 43d3, 46.2N, 59.95W, September 14 1991, J.B. Smith, UCCB • Grand Mira North, 44a1, 45.87N, 60.3W, September 23 1995, K.J. Aucoin, UCCB • Salmon River Road, 44a1, 45.9N, 60.33W, Augut 23 1998, DA • Sydney, 43b3, 46.13N, 60.17W, September 23 1992, J.T. Hoyt, UCCB • University College of Cape Breton campus, Sydney, 43b3, 46.13N, 60.17W, August 22 1985, ST, October 4 1994, RSM, September 4 1996, J. MacMillan, UCCB; **INVERNESS CO.** • Pembroke Lake, inland from Grand Étang, 37a4, 46.54N, 62.04W, September 2 1917, J.M. Francis, UCCB • Ashfield, 34e1, 45.89N, 61.16W, August 21 1998, DA • Ashfield Road, beaver pond, 34e1, 45.89N, 61.16W, August 21 1997, DB, DA • Eden, 34e2, 45.85N, 61.15W, August 21 1998, DA • Gypsum quarry, River Denys, 34d2, 45.89N, 61.23W, September 18 1997, DB • MacLean Point, Denys Basin, 39a1, 45.9N, 61.03W, August 2 1998, DB; **RICHMOND CO.** • Point Michaud, 39d4, 45.58N, 60.7W, August 23 1998, DA; **VICTORIA CO.** • Big Harbour Ducks Unlimited impoundment, 38d3, 46.15N, 60.63W, October 13 1997, DB • Cow Bay, 38b4, 46.07N, 60.89W, September 28 1997, DB • Morrison Point, Cow Bay, 38b4, 46.07N, 60.89W, August 17 1997, DA • Warren Lake, CBHNP, 37e2, 46.72N, 60.39W, August 15 1984, RM.

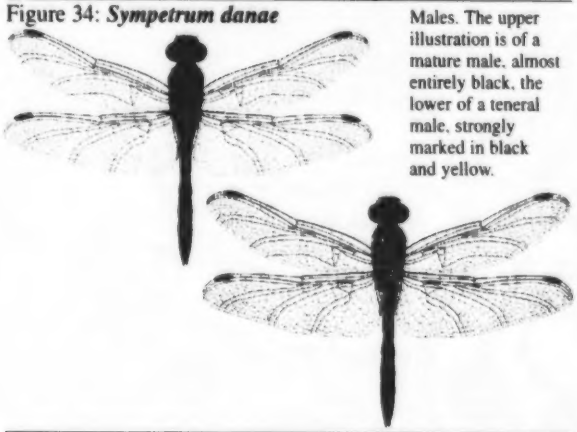
Sympetrum danae (Sulzer 1776)

Black Meadowhawk
sympétrum noir
First: CBI, LL and HL (1997, P.M. Brunelle).
Global: G5
Canada: N5
Nova Scotia: Yellow Status

This is a northern species of slow waters, occasionally found at salt-marshes where its larvae may develop in brackish pools. The species is atypical in colouration for its genus, tenerals and females being a striking yellow and black, mature males virtually black overall. During 1997 it was encountered at a number of habitats both in the Lowlands and the Highlands. The first encounter was of a mature male at MacDonalds Pond on the eastern Cabot Trail, a cattail pond. Subsequently it was found guarding territory at the brackish saltmarsh ponds of St. Anns Picnic Park a short distance to the south and at the sphagnum ponds of the small bog 14km (8.7mi) north of the Causeway on Highway 105. Its discovery as a teneral first day at the Cheticamp Dam fen on August 28th 1997 suggested a markedly later flight period in the Highlands than in the adjacent Lowlands, and a teneral on its maiden flight was taken at a small pond on Everlasting Barren on September 9th 1997. The species is infrequently encountered in the Maritimes and even rarer in New England, and warrants survey effort. It can be discriminated from similar *Leucorrhinia sp.* by the lack of the small triangular basal black patch on the hindwings.

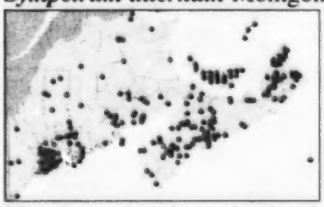
INVERNESS CO. • sphagnum bog, Highway 105, 14km (8.7mi) north of Canso Causeway bridge, 34c3, 45.77N, 61.33W, August 27 1997, PB; **VICTORIA CO.** • 'Cheticamp Flowage Dam overflow fen', north end of dam, 37c3, 46.66N, 60.67W, August 28 1997, September 6 1997, PB • 'Everlasting Barren Bog', northeast of Cheticamp Flowage dam, 37c2, 46.67N, 60.65W, September 6 1997, PB, Teneral • MacDonalds Pond, Cabot Trail, 37e5, 46.39N, 60.51W, August 3 1997, PB • 'St. Anns Picnic Park Marsh', North Gut, St. Anns Harbour, Cabot Trail, northwest of St. Anns, 38d3, 46.21N, 60.63W, August 21 1997, PB • Wreck Cove Road, small bog at roadside, 37d4, 46.55N, 60.62W, July 25 1998, DA.

Figure 34: ***Sympetrum danae***



Males. The upper illustration is of a mature male, almost entirely black, the lower of a teneral male, strongly marked in black and yellow.

Sympetrum internum Montgomery 1943



Cherry-faced Meadowhawk
sympétrum intime
First: CBI, LL and HL (Walker 1933, as *Sympetrum decisum*), HL (1917, F. Johansen, CNCI).
Global: G5
Canada: N5
Nova Scotia: Green Status

The cherry-faced meadowhawk is the most common species of the genus in the region (acknowledging probable frequent confusion with *S. janeae* and *S. rubicundulum*) and is often found in extraordinary numbers. Hybridization with *S. rubicundulum* is probably common and a mating pair of the two species (female *S. internum*) was taken in 1997 in the Lowlands. The face, although usually reddish, is sometimes yellow.

CAPE BRETON CO. • Big Pond, 43b2, 46.25N, 60.23W, September 25 1994, J.M. McDougall, UCCB • Campbelldale Road, 44b1, 45.84N, 60.26W, August 3 1998, DA • Campbelldale Road, bog, 44b1, 45.89N, 60.27W, August 3 1998, DA • Florence, 43b2, 46.25N, 60.25W, August 26 1993, J.M. Francis, UCCB • Glace Bay, 43d3, 46.2N, 59.95W, August 31 1996, K.D. McNeil, UCCB • Lingan, 43c2, 45.23N, 60.03W, September 15 1991, K. Crane, UCCB • Mabou Gardens, Sydney, 43b3, 46.13N, 60.17W, August 24 1996, W.M. Masters, UCCB • Morrison Road, 43c4, 46.07N, 60.15W, August 3 1998, DA • Sydney, 43b3, 46.13N, 60.17, September 15 1991, M. Osborne, K. Morgan, UCCB • University College of Cape Breton campus, Sydney, 43b3, 46.13N, 60.17W, July 24 1985, July 29 1985, ST, D.M. Ball, UCCB, J.T. MacIntyre, A.A. Risk, UCCB, September 5 1996, S. Gallant, J.N. MacGillivary, C.M. Cormier, UCCB • Westmount, 43b3, 46.13N, 60.21W, August 15 1996, D.W. Forbes, UCCB; **INVERNESS CO.** • Ashfield, 34e1, 45.89N, 61.16W, August 7 1998, DA • Ashfield Road, beaver pond, 34e1, 45.89N, 61.16W, August 29 1997, August 11 1997, DB • Big Brook, Georgia Pacific Mine, cattail pond, 34d2, 45.81N, 61.23W, September 22 1997, DA • Caribou Barrens, CBHNP, 37c2, 46.72N, 60.67W, July 26 1996, RL • Cheticamp, 37a3, 46.64N, 61.02W, J.M. Francis, UCCB • Fiset Brook (as 'Plateau River'), Cheticamp, 37a3, 46.6N, 61.02W, August 15 1917, A.G. Huntsman, Walker 1933 • Glenora, 34d3, 45.74N, 61.32W, September 10 1997, DA • Glenora, gravel pit cattail pond, 34d3, 45.74N, 61.32W, September 10 1997, DA • Glenora Road, 34d3, 45.73N, 61.3W, August 27 1997, DA • Grammo Point, 39a1, 45.84N, 60.76W, September 8 1998, DB • Gypsum quarry, River Denys, 34d2, 45.81N, 61.23W, September 18 1997, DB • Jim Campbells Barren, 37b4, 46.56N, 60.89W, August 8 1998, DA • Keppoch Highlands, 38a3, 46.15N, 61.05W, August 5 1998, DA • Lewis Mountain, ditch, 38a4, 46.05N, 61.04W, September 12 1997, DA • Morrison Road, 43c4, 46.07N, 60.15W, August 3 1998, DA • Pembroke Lake, inland from Grand Étang, 37a4, 46.54N, 62.04W, September 2 1917, J.M. Francis, UCCB • Queensville, bog, 34c3, 45.75N, 61.35W, August 7 1998, DA • Rough Brook Road, 33d3, 45.73N, 61.33W, July 24 1998, DB • sphagnum bog, Highway 105, 14km (8.7mi) north of Canso Causeway bridge, 34c3, 45.77N, 61.33W, August 27 1997, PB; **RICHMOND CO.** • bog, Highway 104, Cannes, 39a4, 45.64N, 60.98W, August 2 1998, DA • Gracieville, 39c5, 45.58N, 60.73W, August 23 1998, DA • Hawker, 39a4, 45.64N, 60.01W, August 2 1998, DA • Hawker, beaver pond, 39a4, 45.64N, 60.01W, August 2 1998, DA • MacIntyre Road, 34c3, 45.77N, 61.35W, September 15 1998, DA • Point Michaud, 39d4, 45.58N, 60.7W, August 23 1998, DA; **VICTORIA CO.** • 4km (2.5mi) east of South Harbour, CBHNP, 36e5, 46.85N, 60.44W, July 11 1983, RL • Baddeck, 38c4, 46.1N, 60.77W, August 14 1944, August 7 1948, DF, Cook 1950, July 6 1954, T.K. Bentley, NSM • Baddeck Bridge, 38c4, 46.12N, 60.8W, September 1 1998, DA • Big Barren, 38b2, 46.27N, 60.85W, August 25 1998, September 1 1998, DA, September 2 1998, DB • Birch Point, 38b4, 46.06N, 60.86W, September 7 1998, DB • bog, east of Park Spur, 37c4, 46.52N, 60.7W, July 23 1998, DB • Brian Point, 38b4, 46.06N, 60.88W, August 17 1998, DB • Cabot Trail at Neils Harbour, CBHNP, 42a1, 46.82N, 60.35W, July 29 1917, A.G. Huntsman, Walker 1933 • 'Cheticamp Flowage Dam overflow fen', north end of dam, 37c3, 46.66N, 60.67W, August 28 1997, PB • Cow Bay, 38b4, 46.07N, 60.89W, September 1 1997, September 7 1997, DB • 'Everlasting Barren Bog', northeast of Cheticamp Flowage dam, 37c2, 46.67N, 60.65W, August 28 1997, PB • Green Point, 38a5, 46.02N, 60.97W, July 25 1998, DB • Highland Road, Mile 5 (8.1km), 38b3, 46.19N, 60.84W, July 23 1998, DB • Highland Road, Mile 6 (9.7km), 38b3, 46.19N, 60.84W, July 30 1998, DA • Highland Road, Mile 29 (46.7km) bog, 37c4, 46.52N, 60.7W, July 30 1998, DA • Jigging Cove Lake, CBHNP, 42a1, 46.79N, 60.33W, August 15 1984, RM • MacMillan Road, bog, 37c4, 46.51N, 60.73W, July 25 1998, DA • Morrison Point, Cow Bay, 38b4, 46.07N, 60.89W, August 17 1997, DB • Paquets Lake, CBHNP, 37e1, 46.83N, 60.43W, August 14 1983, JEM, RM, August 15 1996, PB • 'St. Anns Picnic Park Marsh', North Gut, St. Anns Harbour, Cabot Trail, northwest of St. Anns, 38d3, 46.21N, 60.63W, August 21 1997, PB.

Sympetrum janeae Carle 1992

Jane's Meadowhawk
sympétrum de Jane
First: CBI, LL and HL (Carle 1992*).
Global: G5
Nova Scotia: Indetermined

This species of slow waters is very similar to *S. internum*, and is not fully accepted at this point. Keying within this project has not included it, following a generic review the issue should be reconsidered. *Current records have been accepted from determinations by Dr. Carle of specimens at CNCI

INVERNESS CO. • Cheticamp, 37a3, 46.64N, 61.02W, J.M. Francis, UCCB • Pembroke Lake, inland from Grand Étang, 37a4, 46.54N, 62.04W, September 2 1917, J.M. Francis, UCCB; **VICTORIA CO.** • Baddeck, 38c4, 46.1N, 60.77W, July 24 1936, TF.

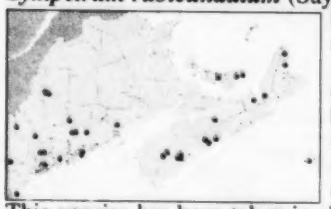
Sympetrum obtrusum (Hagen 1867)

White-faced Meadowhawk
sympétrum éclaireur
First: CBI, LL and HL (Walker 1933).
Global: G5
Canada: N5
Nova Scotia: Green Status

A species of slow waters, the white-faced meadowhawk is very similar to *S. internum* but can be discriminated by its white mask, and the form of the secondary genitalia and vulvar laminae.

CAPE BRETON CO. • University College of Cape Breton campus, Sydney, 43b3, 46.13N, 60.17W, September 4 1996, A.A. Risk, UCCB, September 5 1996, J. Meagher, UCCB; **INVERNESS CO.** • Fiset Brook (as 'Plateau River'), Cheticamp, 37a3, 46.6N, 61.02W, August 5 1917, A.G. Huntsman, Walker 1933 • Orangedale, 34e1, 45.9N, 61.1W, August 12 1997, DA; **VICTORIA CO.** • Baddeck, 38c4, 46.1N, 60.77W, July 24 1936, July 27 1936, TF.

Sympetrum rubicundulum (Say 1839)

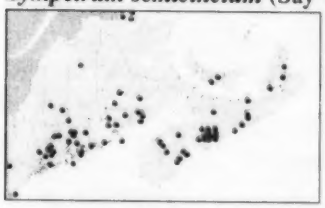


Ruby Meadowhawk
sympétrum à dos roux
First: CBI and HL (1996, P.M. Brunelle), LL (1997, P.M. Brunelle).
Global: G5
Canada: N5
Nova Scotia: Indetermined

This species has been taken in slow waters in the Highlands and Lowlands, but not from peat ponds in the barrens. *S. rubicundulum* is larger than its congeners, except *S. costiferum*, and can be discriminated by the secondary genitalia and vulvar laminae, although there remains some taxonomic uncertainty and hybrids may be present.

INVERNESS CO. • sphagnum bog, Highway 105, 14km (8.7mi) north of Canso Causeway bridge, 34c3, 45.77N, 61.33W, August 27 1997, PB; **VICTORIA CO.** • Paquets Lake, CBHNP, 37e1, 46.83N, 60.43W, August 15 1996, PB • Wreck Cove Flowage, Wreck Cove Road, 37e4, 46.55N, 60.5W, August 3 1997, PB.

Sympetrum semicinctum (Say 1839)

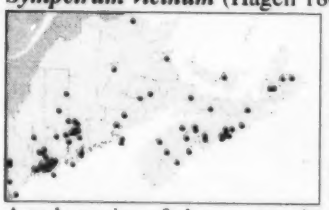


Band-winged Meadowhawk
sympétrum semi-ambré
First: CBI (Martin and Allyson 1987), LL (1997, P.M. Brunelle).
Global: G5
Nova Scotia: Green Status

This species of cattail ponds and slow waters in general is distinct in both genders due to the large amber basal spot on the hindwings. It is well disbursed in the region and probably more common on CBI than the few records suggest.

INVERNESS CO. • Ashfield, 34e1, 45.89N, 61.16W, August 5 1998, DA; **VICTORIA CO.** • Big Harbour Ducks Unlimited marsh, 38d3, 46.15N, 60.63W, October 13 1997, DB • MacDonalds Pond, Cabot Trail, 37e5, 46.39N, 60.51W, August 3 1997, PB.

Sympetrum vicinum (Hagen 1861)



Yellow-legged Meadowhawk
sympétrum tardif
First: CBI and LL (1993, C.M. Cash, UCCB), HL (1999, D. Anderson, DNRB).
Global: G5
Canada: N5
Nova Scotia: Green Status

A red species of slow waters in general, the yellow-legged meadowhawk is distinctive in its yellow, amber or brown legs – all other species in the genus having ebony legs. Teneral determination should be substantiated by morphological keying as other species can have light-coloured legs for a short time as tenerals.

CAPE BRETON CO. • Glace Bay, 43d3, 46.2N, 59.95W, September 21 1994, T.L. Gregor, UCCB • University College of Cape Breton campus, Sydney, 43b3, 46.13N, 60.17W, September 26 1993, C.M. Cash, UCCB, September 29 1993, J.H. MacDonald, D.M. Ball, UCCB, September 14 1994, P.G. Browner, UCCB, October 4 1994, RSM; **INVERNESS CO.** • beaver pond, Ashfield Road, 34e1, 45.89N, 61.16W, August 21 1998, DB • Orangedale, 34e1, 45.9N, 61.1W, August 12 1997, DB; **VICTORIA CO.** • Big Harbour Trout Pond, 38d3, 46.15N, 60.63W, September 27 1998, DB • Red Point West, 39a1, 45.92N, 60.95W, August 2 1998, DB.

Specific Exclusions

Although *Enallagma exsulans* and *Hagenius brevistylus* were included in the species listed in Martin and Allyson (1987) it was not clearly stated in the document that they had been found on CBI and no specimens were found in the BRC collection at CNCI. Consequently they are now withheld from the list although published as present in Brunelle (1997a) on the basis of the Martin and Allyson report. Their presence on the Island would not be surprising considering distribution elsewhere in the Maritimes. Both are found at running waters, or on the active shores of lakes.

Potential Additions

The distribution of the following twenty-three species in the region suggests that they might possibly be found on Cape Breton Island.

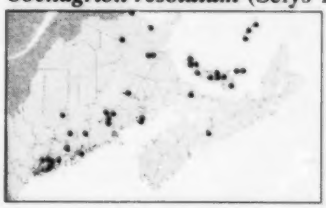
Lestes vigilax Hagen in Sélys 1862

Swamp Spreadwing
lestes matinal
A large species of acidic ponds.

Coenagrion interrogatum (Hagen in Sélys 1876)

Subarctic Bluet
agrion ponctué
The sole record in Maine is decidedly disjunct. This is a pale blue species of grassy fens, with a thick exclamation mark on its shoulders.

Coenagrion resolutum (Sélys 1876)



Taiga Bluet
agrion résolu
A bright blue species resembling an *Enallagma*, but with green on the ventral thorax and abdomen.

Enallagma exsulans (Hagen 1861)

Stream Bluet
agrion exilé
The only obligate running water species of its genus, and large for a bluet.

Enallagma minusculum Morse 1895

Little Bluet
This small species is powder blue with royal blue shoulder stripes, and is typically found in emergent plant beds on lakeshores.

Aeshna constricta Say 1839

Lance-tipped Darner
aeschne constrictor
This species is similar in form to *A. u. umbrosa*, but much more colourful.

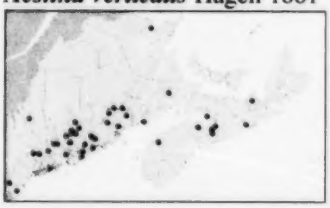
Aeshna juncea (Linnaeus 1758)

Sedge Darner
aeschne des joncs
Very likely for CBI, this is a species of marshes and grassy fens, similar in appearance to *A. tuberculifera* but smaller.

Aeshna septentrionalis Burmeister 1839

Azure Darner
aeschne septentrionale
This species was reported for Nova Scotia in Hagen (1861). It seems likely that the reference is actually to *A. sitchensis*, as *A. septentrionalis* is a very northern species.

Aeshna verticalis Hagen 1861



Green-striped Darner
aeschne verticale
A species of ponds and fens, the green-striped darner is very similar in appearance to *A. canadensis*, and requires careful keying.

Boyeria grafiana Williamson 1907

Ocellated Darner
aeschne fuligineuse
A species of rivers and lakes, *B. grafiana* has likely often been mistaken for *B. vinosa* in the south, but is decidedly gray in colour, rather than brown.

Dromogomphus spinosus Sélys 1854

Black-shouldered Spinyleg
gomphe épineux
This is a large gomphid of lakes, notable for the long spines on its legs.

Hagenius brevistylus Sélys 1854

Dragonhunter
l'hagénie
The largest species of its family in North America, the dragonhunter is found on lakes and rivers.

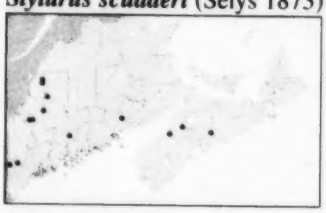
Ophiogomphus colubrinus Sélys 1854

Boreal Snaketail
ophiogomphe boréal
This northern species is the only gomphid known in Newfoundland. It is very similar to *O. rupinsulensis*.

Ophiogomphus rupinsulensis (Walsh 1862)

Rusty Snaketail
ophiogomphe roussâtre
Notable for its brown abdomen and bright green thorax, this species is found in mesotrophic rivers and streams.

Stylurus scudderi (Sélys 1873)



Zebra Clubtail
gomphe de Scudder
A large gomphid with a strongly ringed abdomen, similar to some *Somatochlora sp.* but having eyes widely separated.

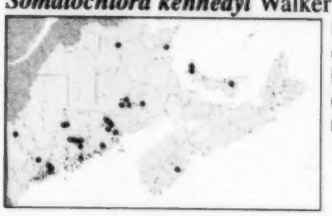
Epitheca princeps (Hagen 1861)

Prince Baskettail
épithèque princière
The largest emerald in North America, the prince baskettail has variable dark markings on its wings similar to those of *Libellula pulchella*.

Somatochlora franklini (Sélys 1878)

Delicate Emerald
cordulie de Franklin
Notable in the extreme thinness of its abdomen, the delicate emerald is almost certainly to be found on CBI.

Somatochlora kennedyi Walker 1918

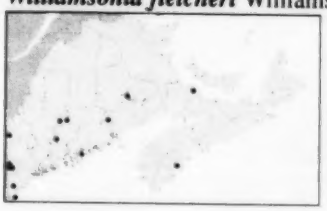


Kennedy's Emerald
cordulie de Kennedyi
Kennedy's emerald is difficult to discriminate from *S. forcipata*, requiring careful keying.

Somatochlora whitehousei Walker 1925

Whitehouse's Emerald
cordulie de Whitehouse
Known in the region only from Newfoundland and Labrador, and little below 50°N in Québec, this is one of the most northern species of the order.

Williamsonia fletcheri Williamson 1923



Ebony Boghaunter
cordulie bistrée
A tiny species of fens and bogs, the ebony boghaunter flys in May, very early in the year for an odonate, and this may account for its perceived rarity.

Leucorrhinia patricia Walker 1940

Canada Whiteface
leucorrhine nordique
A small species of peatland ponds and fens, very similar to *L. hudsonica*, the Canada whiteface has a short flight early in June.

Nannothemis bella (Uhler 1857)

Elfin Skimmer
nannothème d'elfe
The elfin skimmer is the smallest dragonfly in North America; the powder blue males are found beside acidic ponds, the black and yellow females a short distance away.

Sympetrum corruptum (Hagen 1861)

Variegated Meadowhawk
sympétrum bagarreur
This species is western, but occasionally found as a vagrant along the Atlantic seaboard.

Recommendations

There is insufficient data as yet for firm conclusions regarding many aspects of the distribution and status of Odonata on Cape Breton Island. Consequently, future efforts should be in survey, with another assessment of status after sufficient further information has been found to warrant it.

Objectives

These survey efforts should be designed to serve the following objectives.

1/ To determine distribution patterns within the Highlands, larval and adult sampling should be done throughout the Highlands and particularly in the barrens ponds, with discrimination of pond type sampled.

2/ To determine the species composition of the Lowlands, and to begin discrimination between the fauna of the Lowlands, marginal Lowlands and Uplands, sampling should be done throughout the island.

3/ To determine if the populations of the significant, easily-determined species *Aeshna sitchensis*, and *Somatochlora septentrionalis* are stable, ongoing monitoring of their adult and larval populations should be done in the 'flarks', or small, shallow ponds of the barrens. This focussed program should be extended to *Somatochlora brevicincta* if the breeding habitat of that species is located. See Table 3 for the dates of flight of these species.

Means

While collecting could be done in part by available personnel after some simple training and with minimal equipment, determination of larvae and confirmation of adults should be done by trained persons. Adults could be initially determined by interested persons with the aid of the publications Walker 1953, 1958, Walker and Corbet 1975, and Westfall and May 1996. Considerable general information and some identification assistance can be had from Dunkle 1989, 1990, Carpenter 1991, and Legler et al 1998.

Larval sampling in the Highlands should occur in late May and early June, and again in September; these are the periods in which final instar larvae should be present. Larvae should be sampled in the Lowlands between early May and late June. Adult sampling in the Highlands should occur from June to October, in the Lowlands from mid-May to October.

A seminar should be conducted to acquaint personnel with collecting, preserving, records keeping and basic determination methods; this would greatly increase the value of their efforts. Determination of the high-profile species *Aeshna sitchensis, Somatochlora septentrionalis* and *Somatochlora brevicincta* should be dealt with specifically at this seminar.

Private collection should be encouraged, provided the information is deposited responsibly, and one way of doing this would be to have a field trip, well publicized, to the Highland barrens, possibly preceded by the seminar or a public talk. Regardless of the resources brought to bear on this project the return will be much greater with the enthusiastic participation of amateurs (Brunelle 1997b).

An additional and inexpensive means of ensuring that information reaches the Park would be to provide collection forms to interested persons in the expectation that they would return copies of their findings to the provider. The forms and manual system recently instituted by the Maine Department of Inland Fisheries and Wildlife (Brunelle 1999d) has proven to be an effective pattern for organizing volunteer contribution.

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